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THE CONSERVATION OF LIVING RESOURCES IN INLAND WATERS

by

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Until some decades ago large areas of the earth's surface were unknown and were therefore preserved in their natural conditions, not yet influenced by man. Lately however, with the progress of ways of communication, growing industrialization, together with extensive reclamation works and agrarian transformation, even in areas formerly hardly accessible at all, the problem of defence of the natural environment has appeared. In consequence, it becomes more and more necessary and important to preserve and protect animal and vegetable resources which are natural food sources for humanity, and to protect the areas where such resources are produced.

This defence and conservation is no longer a problem which concerns only a limited part of the earth's surface: Europe, the Mediterranean countries and parts of Asia and America, seats of ancient civilizations, but also concerns continents like Central and South Africa, South America and Australia which, until a short time ago, had remained to a great extent in their natural state.

Particularly worrying is the harmful action which threatens the natural resources of fresh waters, which are used by man for water supply and from which an ample source of food can be obtained through fishery and pisciculture.

These problems were the subject of discussions during the 7th Technical Meeting of the International Union for the Conservation of Nature and Natural Resources which took place in Athens, Greece from 11 to 19 September 1958. I was General Reporter at that Meeting where two main background papers (Larkin, 1958; Dill and Kesteven, 1958) were presented, as well as a great variety of experience papers, which outlined the principal aspects of the influence man can exercise on the living resources of flowing and standing inland waters.

All deforestation and reforestation works, with the consequent increase or decrease in erosive and alluvial deposits, the drying of swamps or wetland and agricultural reclamation, the construction of dams and impoundments, the embankment and regulation of streams, the diversion of water by means of canals and new waterways, the regulation of estuaries and littoral lagoons, the pollution of rivers and lakes by domestic sewage and industrial wastes, influence the living resources in most cases in a harmful way.

These actions might have pronounced effects. It is enough to cite two examples:

In the rivers of the Paleartic and Neartic regions, where migratory Salmonids (salmons and trouts) is one of the most important fishery production, dams and impoundments built for hydro-

electricity for domestic or industrial purposes, for irrigation, or to regulate the flow of running waters to prevent floods, represent impediments to the upward migrations of spawning fish and to the downward migrations of spent reproducers and of the young ones. These impediments may only partly be avoided through fish-ways, fish-locks, fish-lifts, transport of fishes over dams or other means.

Where these obstacles are numerous and consist of high dams, they prevent almost completely the passage of migratory fishes. This has happened in the rivers of Eastern Sweden (Norrland), which constitute the spawning places for Baltic salmon. Because of the numerous hydro-electric power stations, the rivers of this part of Sweden have lost their importance as young salmon (smolt) producers. The only way to preserve the salmon stock of the Baltic is therefore artificial fertilization and the rearing of fry to the smolt stage. With such a method it is possible to maintain an adequate stock of salmon. This is however a very expensive way of achieving this purpose (Runnstrom, 1958; Lindroth, 1958).

Another example of the outstanding results of man's work for the living resources in fresh waters is the one of the Welland Canal, constructed between 1825 and 1829 to make possible navigation from Lake Ontario to Lake Erie, by passing the Niagara Falls. After a century of its existence, the canal has given passage to sea lamprey, *Petromyzon marinus*. The first lamprey was found in Lake Erie in 1922 and in 1935 its reproduction was ascertained in tributaries of this lake. In the following years sea lampreys were recorded from Lake Michigan (1936), Lake Huron (1937), Lake Superior (1946). The presence of lampreys caused great damage to lake trout, *Salvelinus namaycush*. In Lake Michigan 6,498,000 pounds of trout were caught, in 1944, while in 1955 the catch Was only 55 pounds. The species has nearly disappeared (Trautman, 1958; Moffett, 1957).

The measures which may alter the ambient conditions of running waters consist principally in dams and impoundments, diversion of water by means of canals and pollution.

As has already been seen, dams and impoundments have a negative effect on fish migration. The artificial lakes created for hydro-electric purposes or for water reserve, offer for the reproduction of fishes conditions less favourable than the natural lakes, because of their frequently irregular thermal behaviour and, first of all, because of the fluctuation of the water level, often unfavourable to spawning. This is the reason why barrages are specially harmful in rivers where there are important spawning places for fishes. Where there are no river immigrants of economic importance, this harmful action is missing or has less importance. On the contrary, sometimes dams and impoundments may be useful for the creation of new bodies of productive waters. This was the case with the multi-purpose impoundments of the Tennessee Valley (USA) which have created approximately half a million acres of additional fishing waters with at least a fifty-fold improvement in fishery (Wiebe, 1958).

In general, in the river systems where migratory fishes are not the main representatives of the fish fauna,

the effects of the impoundments may be harmful or sometimes even favourable. That happens particularly in tropical regions. This has been said of Southern Rhodesia (Maar, 1958) and in the Lufira River tributaries of the Congo (Damas, 1958). There may however also be other bearings on the dispersion of fishes, on the trophic conditions of the bodies of water, etc. (Van Someren, 1958; Daget, 1958; Worthinton, 1958).

The bearings which impoundments and artificial lakes can have on the conservation of natural water resources should be evaluated case by case in connection with the general environmental conditions, the existing fish fauna, the characteristics and the functioning of the artificial lakes. The dispersion of water due to these works is also taken into consideration and, in hot climates particularly, those due to evaporation of water.

Diversion canals for hydro-electric or irrigation purposes can produce loss of fishes which may also be damaged when entering the turbines. It is therefore advisable to prevent fish from entering such canals or conduits or to remove them.

The conditions of competition between predatory and preyed fishes may be also modified in environments where formerly they were absent, as in the example already mentioned of lampreys.

Much more harmful are generally the pollution, and physical and chemical changes in water, due to sewage and industrial wastes, which may cause oxygen depletion, presence of toxic substances, increase of silt and other suspended materials.

All these inconveniences should be remedied if the production of the natural resources of internal waters is to be preserved. This conservation should aim at the protection of the natural ecosystems, that is, the relations between living beings and environment and among them, the existing vegetable and animal species, not only aiming at the aesthetic and scientific purposes of the protection of nature, but also in favour of a productive purpose.

The more and more frequent obstruction in waterways should be accompanied by provisions or devices which allow the migratory fishes to overcome these obstacles.

The artificial bodies of water can very well help the breeding of fishes, but it is necessary that the fluctuations in the water level are controlled in order to avoid that the spawning beds remain uncovered, that the fishes remain without water, that unfavourable thermal conditions are established.

The entrance of fish into diversion canals, in which they may find unfavourable conditions, can be avoided through low electric charge cables, screens, etc. All pollution and industrial wastes can be avoided through decanting basins, neutralization and sedimentation of harmful substances. When the discharge of these substances cannot be avoided, account should be taken on the one hand of the amount of water, the currents and the thermal conditions and on the other hand of the possibilities of pisciculture in the water into which the industrial wastes are being discharged.

In any case, it seems necessary that in the planning of any major work of water regulation, or soil conservation,

or in general, in industrial and agricultural acivities which concern waters, the problems of the production of the living resources and the productivity of the waters should be taken into consideration.

The industrial needs are often pre-eminent and cannot be hindered by protection of flora or fauna; but fauna also has great interest for economic purposes, and for this reason it is being taken care of in accordance with the progress and development of the other activities concerning the waters.

If, as happens frequently, industrial works, agriculture, hydraulic works for navigational purposes etc. alter or destroy pre-existing ecosys ems and also living natural resources, it is opportune that they be substituted by others which make up for their loss.

Artificial fertilization can substitute natural reproduction; introduction of new species may substitute those which have ceased to find favourable environmental conditions; the creation of spawning beds and breeding ponds may compensate for the loss of lakes or natural water courses.

In any case, all provisions, directed either at the protection of existent ecosystems and living resources, or at the substitution of those which have been lost, or at the creation of new sources of production, should be based on the hydro-biological study of environments. Generally, research done elsewhere cannot entirely be applied to different environments, but every case should be studied separately.

The necessity exists therefore for a preliminary hydrobiological investigation of the environments concerned, which is liable to be changed through the necessities of industrial and agricultural progress, and for the undertaking of a study in conjunction with the planning of new works, as well as the control of influences which these may have on the natural resources.

REFERENCES

DAGET, J. (1958). Effets du barrage de Markala sur les migration de poissons dans le Moyen-niger. *Meeting of the International Union for the Conservation of Nature and Natural Resources, Athens, 11–19 September, 1958* (*Mimeo*).

DAMAS, H. (1958). Le Lac de barrage de la Lufira. *Ibid.*

D'ANCONA, U. (1958). An Introduction to the Theme and a Summary of the Background and Experience papers. *Ibid.*

DILI, W.A. and G.L. Kesteven (1950). Methods of minimizing the deleterious effects of water-and land-use practices on aquatic resources. *Ibid.*

LARKIN, P.A. (1958). The effect of various conservational measures or works on the aquatic environment and on the stocks of that environment. *Ibid.*

LINDROTH, A. (1958). Anadromous fish conservation in a Swedish Salmon River. *Ibid.*

MAAR, A. (1958). Dams and drowned-out stream fisheries in Southern Rhodesia. *Ibid.*

MOFFETT, J.W. (1957). Recent changes in the deep-water fish populations of Lake Michigan. *Trans. Amer. Fish.* Soc., 86:97-111.

RUNNSTRÖM, S. (1958). Hydro-electric power stations and fishing. *Meeting of the International Union for the Conservation of Nature and Natural Resources, Athens, 11-19 September 1958 (Mimeo).*

TRAUTMAN, M.B. (1958). Diversion, canals and conduits: Their role in introducing aquatic organisms into drainage basins where they did not reside formerly. *Ibid.*

VAN SOMEREN, V.D. (1958). Fishery problems created by water utilization projects in Scotland and East Africa. *Ibid.*

WIEBE, A.H. (1958). The effects of impoundments upon the biota of the Tennessee River system. *Ibid.*

WORTHINGTON, E.B. (1958). The influence of soil and water conservation on natural aquatic resources. *Ibid.*

Fish Get Ulcers Too!

BOSTON, Ontario, Jan. 14–(AP)–Fish, like humans, have ulcer problems.

Kenneth Higgs, field officer of the Metropolitan Toronto Conservation Authority, told an authority meeting that 250 dollars will be spent this year on drugs to keep fish in Authority ponds free of ulcers and other ailments. The Authority raises its own game fish.

GENERAL TRENDS

World Fish Catch Increasing 5% per Year

The latest world fish catch figure is 29,960,000 tons (1957), which shows an increase of almost 50% over the catch in the last full fishing year before World War II, 1938, when 20,500,000 tons were landed, according to the latest edition of the FAO *Yearbook of Fishery Statistics* (Vol. VII), just published by the Food and Agriculture Organization (FAO), Rome, Italy.

Since 1947, when the catch (17,940,000 tons) still showed the effects of the war, there has been a steady increase in the total each year as shown by the following figures taken from the *Yearbook*:

1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	..... Million metric tons
....19.09	19.41	20.23	22.75	24.52	24.91	26.80	28.12	29.60	29.96	

The annual increase during the past 5 years has been about 5 %.

Most significant of the increases by continents since 1938 are those of Africa (520,000 to 1,860,000 tons), Asia (9,360,000 to 12,880,000), Europe (5,590,000 to 7,640,000) and USSR (1,550,000 to 2,540,000 tons).

Seven Countries Catch Over 1,000,00Tons Yearly

According to the *Yearbook*, the following 7 countries caught more than 1,000,000 tons of fish in 1957: Japan, 5,399,000 tons; USA (including. Alaska), 2,741,100; China (mainland), 2,640,000 (1956); USSR, 2,535,000; Norway, 1,738,900 India, 1,233,000, and United Kingdom, 1,014,700. Canana (including. Newfoundland), which caught 1,091,900 in 1956, caught only 991,700 in 1957. India, which just topped the million mark for the first time in 1956, moved up two places in 1957.

A study of detailed figures in the *Yearbook* reveals some interesting information. For example, of the 1953-57 average annual world catch of 27,900,000 tons, six countries (Japan, USA, China (mainland), USSR, Norway and United Kingdom caught 55%. The next seven countries caught 19% and the following 27 caught 21%. Thus, the *Yearbook* reveals, the 40 leading fishing countries catch 95% of the world total landing while some 150 other countries only catch about 5% of the total between them.

A *Yearbook* table which gives the world catch by groups of species shows that there is little change in the relative percentages of groups. Herrings, sardines, anchovies, etc., 24% of the total catch, make up the biggest group.

Signs of USSR Expansion in Fisheries

Another table, which summarizes the production of preserved and processed fishery products, reveals some interesting trends. For example, 30 countries in 1948 froze some 553,000 tons of fish. In 1957, these countries froze 1,415,000 tons of fish—nearly three times at much. There has also been a substantial increase in the amount of herrings, sardines, anchovies, etc., which are dried or salted. In 1948, the quantity so processed amounted to 644,000 tons in 30 countries. By 1957, the total had risen to 1,057,000 tons, largely due to the activities of the USSR in this trade.

The table also reveals the very big increase in Russia in canning fish products. In 1946, the Russians canned 46,000 tons but since then they have greatly expanded the industry and in 1957 canned 229,000 tons.

Reports from 31 countries show that, for the first time since World War II, there was a slight decline in production of fish meals and solubles, from 1,395,000 to 1,248,000 tons. This industry's output has grown from 580,000 tons in 1948.

The latest *Yearbook* contains statistics on catches, landings (by weight), production of preserved and processed commodities from all countries. Improved reporting from various countries is reflected in refinements and extensions of several tables.

As before, the *Yearbook* (with English, French and Spanish text) is available throughout the world at $ 3 a copy or 15/- or the equivalent of that sum in any national currency.

FAO Team Studies Mekong Basin Development

A seven-man Mission of experts of the Food and Agriculture Organization arrived in Bangkok from Rome in October 1958 on a two-month preliminary study in Cambodia, Laos, Thailand and Vietnam of the agricultural aspects of a huge and long-range project aimed at developing the lower Mekong River Basin.

The Mission was headed by Mr. G.H. Bacon of the United Kingdom, an agronomist who has spent many years in government service in the Sudan and who has more recently served on important missions sponsored by the International Bank for Reconstruction and Development. The rest of the Mission consisted of Mr. J.F. Dekker (Netherlands), an agronomist; Dr. R. Dudal (Belgium), a soil surveyer; Mr. P. Goormaghtigh (Belgium), an animal husbandry expert, Mr. D.T. Griffiths (U.K.), a forester; Dr. J. Reuter (Netherlands), a fishery biologist; Mr. P. Simonet (France), an economist and Mr. A. de Vajda, an irrigation engineer.

The FAO Mission was supported by funds provided by the United Nations Expanded Technical Assistance Programme, and was formed at the request of the four-nation Committee for the Co-ordination of Investigations on the lower Mekong basin. The Committee is made up of governmental representatives of Cambodia, Laos, Thailand and Vietnam.

Surveys of the river's potential contribution to improving economic conditions in these countries are already under way. The U.N. Economic Commission for Asia and the Far East (ECAFE) has been engaged in engineering surveys on flood control since 1951. In 1955 these studies were extended to the possibility of further development of the area's water resources for navigation, irrigation and generation of power. More recently, the United States International Cooperation Administration carried out a brief reconnaissance with a special eye to problems of land reclamation. And in 1957, a U.N. Technical Assistance Administration team under Lt. Gen. Raymond A. Wheeler of the U.S. reviewed the earlier studies and advised on what further surveys would be necessary for the full development of water and related resources of the basin. The Wheeler mission, stressing the

engineering aspects, proposed a five-year, $9.2 million development programme.

FAO was asked to undertake studies related to the development and conservation of the basin's resources particularly in relation to possible irrigation and flood control projects. The task of the FAO Mission was to identify the problems associated with agriculture, forestry and fisheries and to recommend the scope and nature of further studies, investigations and pilot projects.

The FAO Mission returned to Rome early in December to prepare its report.

On return to Rome, Dr. Reuter, the fishery expert with the Mission expressed the view that so far as the fisheries are concerned, there isn't sufficient information on which to base any judgement as to the effect of the river dams. There are no reliable statistics of the catch of fish in weight or species, nor any reliable information of the migration and spawning habits of local fish.

Dr. Reuter was also of the opinion that an eight-men team of biologists working for at least three years, preferably five, is needed to investigate the fisheries of the lower Mekong basin in order to arrive at a valid estimate of the effects of the proposed Mekong River Development Project.

Gulf of Thailand Survey

Arrangements are now being completed to undertake the second phase of the biological and oceanographical survey of the Gulf of Thailand under the sponsorship of ICA.

The survey will be conducted by personnel of the Scripps Institution of Oceanography, La Jolla, California, with the assistance of the Vanderbilt Foundation. Through the courtesy of this Foundation, the motor yacht *Pioneer*, an ocean-going research vessel, is being made available and the scientific leader of the expedition will be Dr. Anton Fr. Brunn, Lecturer in Oceanology, University of Copenhagen, Denmark.

Recent discussion with the Governments of Vietnam and Thailand have clarified most of the administrative and practical problems involved and the *Pioneer* is expected to arrive in the area early in June 1959. The expedition will receive considerable assistance from scientific, naval and other personnel of Vietnam and Thailand and it is anticipated that the area to be covered will include the Gulf of Thailand and a section of the South China Sea extending outward from the Vietnamese coast.

The programme of operations will require the vessel to be engaged for two years and the detailed schedule of cruises and the preliminary station list are now being prepared.

Dr. Bruun and Mr. J. Faughn of the Scripps Institution, recently visited both Saigon and Bangkok in connection with this project and expressed themselves as eminently satisfied with the assurances of co-operation and assistances which they received.

General Bathymetric Chart of the Oceans

Dr. Böhnecke, as Chairman of the Committee on the General Bathymetric Chart of the Oceans (GEBCO) of the International Association of Physical Oceanography (IAPO), has distributed a questionnaire concerning GEBCO which seeks to ascertain the views of scientific

and other workers on the value of a revision of the GEBCO and on various detailed points concerning its preparation. Copies of the questionnaire have been sent to the members of Special Committee for Oceanographic Research (SCOR), International Advisory Committee on Marine Sciences (IACOMS), IAPO, and International Council for the Exploration of the sea (ICES).

In 1899 it was resolved at the VIIth International Geographical Congress held in Berlin to produce a General Bathymetric Chart of the Oceans (GEBCO) in 24 sheets at the scale of 1: 10 Mill. H.S.H. Prince Albert I of Monaco undertook the preparation of the charts, and at the VIIIth International Geographical Congress in New York the first edition of the General Bathymetric Chart of the Oceans was submitted, which contained 18,400 soundings. This first edition includes nearly all soundings known up to July 1903 and it was accomplished by 7 draughtsmen in only 8 months.

A second edition of the GEBCO was begun in July 1910 and published in the years from 1912 to 1927. This second edition shows 29,000 soundings. After the death of H.S.H. Prince Albert I of Monaco in 1922 all further activity in connection with the GEBCO came to an end.

In 1929 it was resolved at the First Supplementary International Hydrographic Conference to collect all oceanic echo-soundings at one place and to keep the GEBCO up to date without changing either the boundaries or the projection and the scale. Preparations for the third edition were made. The sounding results of research and other ships as well as the soundings which were shown in the most recent publications of charts of the various countries were inserted in 1,001 plotting sheets at the scale of 1 : 1,000,000. They served as basic material for the compilation of the GEBCO 1 : 10 Mill.

In 1955 the third edition with 18 new charts out of 24 was concluded (4 North Polar and 2 South Polar Charts,of these 1 showing land only, were kept unaltered). In this 3rd edition 54,518 selected depths based on approximately 370,000 soundings were shown.

In 1952, at the VIth International Hydrographic Conference, it was recognized that a 4th edition of the GEBCO was necessary but that, in order to keep pace with the steadily growing number of soundings, a new edition should appear at least every 5 years. This refers in the first instance to the Atlantic and to the Pacific and, in fact, priority was given to these regions. Moreover, it was clear to everybody that many an echo-sounding did not come to the knowledge of the International Hydrographic Bureau and for this reason the charts might lack important facts.

In 1958, at the VIIth International Hydrographic Conference, a decentralization was recommended as regards the preparation of the work on the plotting sheets (1 : 1,000,000), having realized that it was of great importance to keep the GEBCO up to date, but that this could not be done by the method hitherto applied, considering the constantly increasing number of observations. Following this recommendation:

a) the Hydrographic Offices of the States Members should prepare and keep up to the present state of knowledge, plotting sheets covering a definite por-

tion of the GEBCO. The Members of the International Hydrographic Bureau (IHB) have been or will be requested to send preparatory lists of their sounding either direct to the respective Hydrographic Offices or to the IHB, Monaco. In this way it is hoped that every few years a new edition of the GEBCO can be published. Canada, France, Germany and Great Britain have agreed already to co-operate in this task.

b) The scientific elaboration of the plotting sheets to an up-to-date GEBCO shall be carried out in future—with a possible financial support by the International Council of Scientific Unions (ICSU)—through members of the International Association of Physical Oceanography (IAPO) Committee which is authorized to co-opt further experts. In order to discuss these problems it is planned:

> to hold a meeting of the members of the Committee on GEBCO as well as of representatives of the volunteering Hydrographic Offices in spring 1959 at Monaco with possible participation of further experts.

Scientific workers in the Indo-Pacific region who may be interested in the questionnaire distributed by Dr. Böhnecke Concerning the revision of Ge EBCO, may obtain copies by writing to: The Secretary, Indo-PacificFisheries Council, FOA Regional Office for Asia and the Far East, Phra Atit Road Bangkok, Thailand.

Dr. Böhnecke may also be directly contacted at the following address:

Dr. Böhnecke,
Chairman, Committee on the General Bathymetric Chart of the Oceans,
International Association of Physical Oceanography
c/o Prof.
Dr. Hakon Mosby
Geofysisk Institut, Bergen, Norway.

Central Agency For ^{14}C Determination Charlottenlund Slot Denmark*

During recent years the study of the primary production in the sea has been one of the main concerns of marine science. The present great interest in productivity is due *inter alia* to the use of the radioactive tracer ^{14}C as a tool for measuring primary production in the sea regardless of the size of the production. Steemann Nielsen first employed the ^{14}C-method for measuring the production of organic matter in the sea on the deep-sea expedition of the "Galathea" 1950-52. The technique has now been used by many investigators all over the world, and it has been routinely included in oceanographic data gathering voyages and on light ships, where the field work is done by the crew.

The most recent description of the different modifications of the ^{14}C-method is found in the articles B.2 and B.3 in "Contributions to Plankton Symposium 1957, Measurements of Primary Production in the Sea". *Rapp. et Proces—Verbaux des Reunions Cons. Perm. Intern. p. l' Explor. de la Mer* 144, 1958.

An important factor in the usefulness of the ^{14}C—technique for measuring

* Communicated on 27 October 1958 by Professor E. Steemann Nielsen, International Agency for ^{14}C Determination, Charlottenlund Slot, Charlottenlund, Denmark.

primary production is that the field work does not presuppose any expert knowledge. On the other hand, the manufacturing of the ampoules containing the solution of NaH $^{14}CO_3$ to be used for the experiments requires a well equipped laboratory and a scientist familiar with radioactive tracer work. The same is true concerning the measurements of the radioactivity of the filters containing the samples.

Whereas large oceanographic institutions ordinarily will have such an expert at their disposal this will not be true for many other marine laboratories. In several instances therefore various institutions have co-operated. The ampoules to be used have been manufactured at one place and sent to another where they have been used for productivity work. The dried filters with the radioactive plankton have in turn been sent back to the first place for measurement. As the half life of ^{14}C is more than 5,000 years, the filters, if properly stored, remain unaltered for a very long time.

During the symposium on "Measurements of Primary Production in the Sea" held at Bergen 27–29 September 1957 by the International Council for the Exploration of the Sea, an *ad hoc* working committee was appointed to deal with the methods for the measurement of primary production. The members were: John H. Ryther (chairman), Grim Berge, Maxwell S. Doty, G.E. Fogg, and E. Steemann Nielsen.

The committee presented recommendations which were adopted unanimously by the about 80 participants of the symposium. One of the paragraphs read "It is suggested that a central agency be established, for example at Charlottenlund under the direction of Prof. E. Steemann Nielsen, which would provide standardized ampoules of ^{14}C, counting of ^{14}C samples, and calculation of carbon assimilation rates."

In January 1958 UNESCO provided funds for establishing the Agency. The "Danish Institute for Fisheries and Marine Research" provided a room at its residence at Charlottenlund Castle, Denmark.

The Agency is organized on a non-profit basis. Professor E. Steemann Nielsen, who is adviser on plankton to the "Danish Institute for Fisheries and Marine Research", will be honorary supervisor. The daily work will be directed by Mr. Vagn Hansen of the same institute. The facilities of the Agency, which was officially opened during the meeting in October 1958 of I.C.E.S. (The International Council for the Exploration of the Sea), are available to all scientific institutions in the world. The consignments will be made in accordance with rules set up by the Danish Ministry of Health.

Standardized ampoules of ^{14}C–activity 0.004 mc.–may be obtained from the Agency at the following prices:

100 ampoules or more ..... D.Kr. 2.75 each

50-99 ampoules ..... D.Kr. 3.00 each

less than 50 ampoules ..... D.Kr. 3.25 each

If the purchaser wishes to have the filter containing the samples from experiments counted by the Agency the total price (including ampoules and numbered membrane filters) will be:

100 ampoules or more
..... D.Kr. 5.00 each
50-99 ampoules
..... D.Kr. 5.25 each
less than 50 ampoules
..... D.Kr. 5.50 each

The prices include packing but exclude transport. Special boxes for the return of the filters when the counting is to be done by the Central Agency will be provided.

The salinity of the sea water used for the experiments must be stated by a customer. It will be sufficient for water from the open ocean to designate "ocean water". The photosynthetic rate will be computed by the Agency. When using either brackish water or freshwater it will be necessary for the customer to determine the total concentration of carbon dioxide in the water.

The water samples to be used for the experiments should be taken with a glass, plastic, or other type non–metalic, non toxic sampler.

Directions for use of ^{14}C tracer will be enclosed in each consignment.

A filtration apparatus operating by pressure obtained by a bicycle pump may be provided from the Central Agency at a price of D.Kr. 300.00.

A suitable water sampler may be provided by Laboratoire Hydrographique, Copenhagen, at a price of 830.00 D.Kr.

Field kits for sample collecting, filtration apparatus, filters etc. may also be provided, on request and at cost price, by Prof. Maxwell S. Doty, Botany Department, University of Hawaii and by Dr. John H. Ryther, Woods Hole Oceanographic Institution, Woods Hole, Mass., U.S.A.

Special holders to be used when drying filters may be obtained at a price of D.Kr. 8.00 each.

Atomic Energy and Fisheries Development.

Atomic energy, particularly through the use of radioisotopes and radiation in research, will play an increasingly important part in the development of the world fishery resources, states Dr. R.A. Silow, Chief of the Atomic Energy Branch of the Food and Agriculture Organization (FAO), Rome, Italy.

Dr. Silow makes this prediction in a report on "The Potential Contribution of Atomic Energy to Development in Agriculture and Related Industries", just published by FAO in English, French and Spanish. Dr. Silow's report covers power applications, the use of radiation in food preservation and processing and in plant breeding, the value of radioisotopes in research and the significance of research to the development of agriculture and related industries, which, of course, include fisheries.

Referring to radioisotopes, Dr. Silow says that the use of them can "accelerate and enhance the contributions of research to the development of world fisheries." He points out that while about three-quarters of the world's surface is occupied by water, it provides less than 2% of the world's food supplies,

but that this 2% represents about 10% of the animal protein consumed.

"Every effort should therefore be made to increase world fish production," Dr. Silow declares. "This can be achieved by extension and intensification of current fishing operations, by improved management of those operations and by effecting advantageous changes in the fisheries resources themselves."

Such a programme calls for the comprehensive investigation of the resources and in such research radioisotopes can be of particular help "in measuring the basic production of water areas, in following the passage of nutrient material through the successive links of the food chains of fish of economic value to man, and in various other parts of the programme."

Dr. Silow adds that the success of such research "will permit a better planning of fishing operations" and more efficient use of resources.

Elsewhere in the report, Dr. Silow points out that the application of nuclear-derived power could be of considerable significance to the fishing industry, particularly "for use in mother and factory vessels of fishing and whaling fleets operating over long periods at great distances from their bases, especially in the Antarctic."

He points out that present power plants in fishing boats, including fuel tanks, occupy about 40% of the available space on board. The introduction of small nuclear propulsion plants could radically change the situation. "The siz of the vessel could be decreased or its speed increased, or the fish-hold space or fish processing space increased for the same sized hull," reports Dr. Silow.

While his report deals largely with agriculture, it is of considerable interest to all engaged in fisheries. Copies of the report are available on request to FAO, Rome.

Lobster Pot Developed with Folding Steel Frame

A folding lobster pot with an all-steel frame, that reportedly can be erected in seconds, is being produced by a Yorkshire firm in the United Kingdom. The folding pot, when collapsed, is said to require one-fifth of the storage space of a rigid pot, thus facilitating handling to and from shore and stacking on decks of fishing vessels.

The folding pots, which are of the Scottish creel type, are made with steel frames of 0.5-inch and 0.25-inch thickenss. The frames are galvanized and protected against corrosion with bitumen paint. The base of the steel frame is 18 by 24 inches, the height is 14 inches, and the length when folded is 38 inches. The frame weighs approximately 9.5 pounds. With netting added, the frame weighs about 11 pounds. Frames can also be manufactured in special sizes and shapes.

The all-steel framework is designed to make ballast unnecessary and reduce resistance to the forces of tide and undertow. Also, the strength of the steel frame is said to withstand storm damage making it unnecessary to remove the lobster pots during gales

The pot frames are equipped with manila-rope netting but can also be supplied with nylon netting. The netting is made in two pieces to facilitate removal for painting the frame or performing other types of maintenance.

Tests made with the new lobster pots indicate that they fish well and that the merits of folding and endurance suggest that they may well prove successful for better fishing and long-term economy.(*The Fishing News*, April 18,1958, *World Fishing*, August 1958 and *Commercial Fisheries Review*, October, 1958.

Underwater Television Research off Cape Cod

Underwater television research on the Cape Cod fishing grounds was conducted by the U.S. Bureau of Commercial Fisheries research vessel *Albatross III* on a three-day cruise that ended 24 April 1958.

The research was concerned with the possible future use of television as a tool for estimating sizes of population of fish. The area off Cape Cod was selected for the clearness of the water at this time of the year. Unfortunately, the weather was bad and artificial lights were necessary to see the fish with the television camera.

The television camera was fastened in the cod end of the net so that the behaviour of the captured fish could be observed. In two of the experiments, holes (9 and 22 inches) were left in the ends of the nets so that the fish could escape. Surprisingly, none of the fish caught made any serious attempt to leave through these back doors. In all likelihood, this was due to the effect of the artificial light used. The fish caught included dogfish, blackback and yellowtail flounders, cod, small haddock, and herring. It was observed that the behaviour of the fish was affected by the net itself, especially when towed at slow speeds.

Simple Diving Equipment for Red Sea Trochus Shell Fishes

The age-old skin diving technique of the Red Sea commercial trochus shell fisherz, which often results in deafness, impaired vision, embolism, cramps and other physical disablement of the divers, is being replaced by the introduction of simple modern diving equipment.

The equipment, consisting of face masks, snorkels, flippers and hand-powered pump and hose units, is being introduced by William Reed, an Australian sea shell fishing expert of the Food and Agriculture Organization (FAO), Rome, Italy, who recently organized a diving training course in Dongonab in Sudan.

The equipment will not only help eliminate the occupational diseases of the skin divers but it will also enable them to fish more trochus and mother-of-pearl shells. One recent test showed that a diver using the equipment collected more shells in 15 minutes than an unequipped skin diver can collect in a whole day's work. The equipment enables divers to stay under water longer, move freely over a wider area of the sea-bed and work safely in deeper water where there are untouched trochus and mother-of-pearl shell beds.

IPFC Current Affairs Bulletin,

The 10-day training course was attended by 12 young men, who were taught by the FAO expert to use, maintain and overhaul the equipment, and to cope with emergencies, including free ascent and the use of artificial respiration,

The students had real demonstrations of life saving when two of them lost consciousness through minor mishaps during diving. Both quickly recovered when treatment was applied by the expert who states: "These two slight accidents were just what was needed to impress upon the men that they were breathing compressed air."

"The course was successful and ended happily," the expert records in a report to FAO. "I presented the two best students with flippers—one was a 14 year old boy—and gave the students a sheep on which we feasted that night."

UNESCO Refresher Course in Marine Biology

A refresher course in marine biology, jointly organized by Unesco and the Institute of Science, Bombay, India was held from 6 October to 14 November 1958, at Bombay, India. Dr. D.V. Bal, Member of the International Advisory Committee on Marine Sciences (IACOMS) and Director of the Institute of Science, Bombay, planned and directed the course with the collaboration of the Unesco Science Co-operation Office for South Asia. FAO offered its collaboration, and Dr. T. Leavastu of the Fisheries Biology Branch assisted Dr. Bal in conducting the course. Dr. J.N. Carruthers of the National institute of Oceanography (U.K.) and Mr. R. Jayaraman, Central Fisheries Sup-station, Bombay olso helped Dr. Bal. In addition to these, there wers numerous parts of India who delivered one or more lectures in their field of specialization.

The participants were fron Burma. Ceylon, India, Nepal, East and West Pakistan and Thailand. They had very different backgrounds and interests, ranging from university professors to B.Sc. students and from entomologists to fisheries biologists. The majority of the participants had a good background in general biology.

In the lectures, emphasis was placed on marine ecology and on the interpretation of the significance of various biological and environmental data in synthesizing the results of marine biological investigations. Marine biology can not be studied without an understanding of the nature of the marine environment and processes in it, and considerable amount of time was spent in teaching basic oceanography.

The greatest emphasis in the field and laboratory exercises was placed on giving experience in the various methods of working and in the use of specialised equipment. Particular attention was devoted to the improvisation of simple efficient gear, in the absence of the latter.

There were five sea cruises, during which the upwelling phenomenon, the currents, the tropical sup-surface oxygen minimum layer and the associated biological phenomena off Bombay were investigated.

NEWS FROM MEMBER COUNTRIES

BURMA

Training in In-shore Fishing Methods

The Government of the Union of Burma has a training programme in in-shore fishing with small boats and also mechanization of local fishing crafts. Training was therefore requested in Canada for a Junior Executive Officer, In-shore Fisheries, Mergui. In response to the request made, the authorities concerned provided a 4-6 month course of training which commenced in the early part of June 1958.

CEYLON

Propagation of Giant Gouramy in Tanks

The Giant Gouramy builds a nest for the purpose of laying its eggs. The next looks very similar to a big bird's nest, except that it is mainly made of fine fibre, stems of aquatic plants and slender twigs, and has a rather small opening.

Under natural conditions, suitable materials for the construction of the nest are not readily available. Furthermore, it takes a period of four to six days for the fish to complete a nest. During this period the process of construction may be interrupted by various causes. Results of experiments have proved satisfactorily that the process of nest building can be speeded up and the fish induced to spawn successfully by the installation of manmade nest frames and the provision of suitable nest building material.

A practical scheme to increase the propagation of Giant Gouramy in the major inland water bodies (tanks) has been initiated by the Inland Fisheries Section of the Department of Fisheries, on the basis of the results of the above experiment. About one hundred nest frames with ample quantities of suitable nest building material have been installed in some of the major tanks where mature gouramy are present. More nest frames and nest building material are expected to be installed every month.

Japanese Experts and Boats

At a simple ceremony held at the Fisheries Harbour, Mutwal on the 21 October 1958 the Japanese Ambassador in Ceylon presented to the Hon. Minister of Industries and Fisheries two mechanized fishing boats. The two boats named the *Nippon Maru* and *Ceylon Maru* are gifts to the Government of Ceylon by the Japanese Government. These two boats are to be used for demonstrations in the Japanese methods

of fishing. For this purpose two Japanese experts, Messrs. Jimbo and Ishei have already arrived in Ceylon and programmes have been prepared for the utilization of these boats.

Good Catches in the Nylon Nets

A significant and most encouraging feature of the fishing activities in Negombo area which augurs well for the future was the great demand for nylon nets that arose in this area due to the successful catches brought in by the nylon nets operated by the 'lepram' (log rafts) fishermen. These fishermen had very good catches averaging an income of around Rs.200 for each day of fishing.

These extra-ordinary catches whetted the enthusiasm for use of nylon nets among the other fishermen who came in their numbers to the fishery office armed with jewellery which they were ready to pawn to buy their requirements of nylon nets. Unfortunately, it was not possible to meet the entire demand.

A new method of Lobster Fishing in Ceylon

The following is reproduced from Ceylon Department of Fisheries Extension *News Letter* No. 10 of 15 January 1959.

Some experiments have recently been conducted by the research section of the Department of Fisheries in order to find out the most efficient type of trap. Forty traps of four different types—some constructed of cane—some of iron—were tested on the coral reefs off Colombo. As a result of these experiments it is now possible to advise people interested in lobster fishing as to the best type of trap suitable for capturing lobsters. Different types of bait were also tested paying attention to availability and cost. It was found that heads of rock fish were the best considering the cost. (A pound of heads costs only =/10 cts.). The experiments showed that as many as 40-80 lobsters could be caught per day with forty traps. It must be noted that the greater number were caught by traps of one type so that it is possible that if one was using the most efficient type of traps a greater number say 80-150 may have been caught. The price of a lobster in the market is about =/50 cts. which means that anyone engaged in this type of fishing could earn as much as Rs.40/ to Rs.75/ per day. Lobster fishing unlike most other types of fishing does not require that the fishermen should remain out at sea while fishing is going on. The method consists in setting the traps just before sunset and lifting them in the early morning. Due attention, however, must be paid to the kind of ground on which the traps are set. Lobster can be caught only when the traps are placed on coral or rocky ground not on sandy or muddy bottom.

It is possible to construct an iron trap for Rs.10/= so that it is not necessary to spend much on gear. It would be advisable for those taking up this form of fishing to construct from 20-40 traps initially. The capital cost is therefore not too great. Besides these trap-frames could be used for at least 2 years. For further details as to the construction of the traps, the Research Section of the Department of Fisheries, Galle Face, Colombo, may be contacted.

Training Course for Fishermen

Four training courses for fishermen have todate been held, two at Jaffna, one at Point Pedro and one is currently being held at Negombo.

These courses have been organized by the Department of Fisheries. Mr. E.R. Kvaran, FAO/ETAP Marine Engineer, gave instruction in English which was translated by the Extension Officer of the area into Tamil or Sinhalese as required. A guest speaker from the Shell Company has spoken on lubrication and fuel oils at each course.

Each course lasted for 5 weeks with 2.1/2 hrs. daily instruction excluding Sundays. Instruction is given with the assistance of a sectionalised Petter 10 p.h. diesel and a Coventry Victor 5/7 h.p. diesel in running condition. The working of the engine as a unit is explained and then the Petter is completely dismantled by the students. The purpose and main features of each part is described and the engine is reassembled by the students. The duties of the operators are then outlined and these include instruction for preparing the engine for starting, running, manouvering and stopping, keeping of a daily log book, monthly and, semi-annual maintenance and servicing. Finally, a comprehensive fault locating chart is worked out and faults which can be treated by the operators are considered in some detail.

The course is very informal and is open to all fishermen who are operating mechanised craft or are interested in so doing. No financial assistance is given to the participants. No test or examination is held on completion of the course but participants are given certificates of attendance.

Total participants in this coures was between 30-40 per each course with daily attendance of 15-25.

Loans for Mechanization

To promote expeditious mechanisation of fishing craft, a scheme providing for loans not exceeding Rs. 15,000 repayable within a period of 6 years was put into operation in August 1958.

The new scheme was made necessary because the existing scheme of Loans to Individual fishermen made it difficult for fishermen to obtain the money that would be necessary for the purchase of a mechanized boat. This was essentially due to the fact that security in immovable property is required from fishermen who wish to obtains loans of over Rs. 3,000/–.

Under the new scheme, which is meant exclusively for financing the purchase of mechanically propelled boats and a reasonable amount of fishing gear to be used from these boats together with the cost of the 1st year's insurance of the boats, no security other than that of the boat that is to be acquired is necessary. It is intended to issue the loans on the basis of a Hire Purchase Agreement by which the ownership of the boats will be vested in the Director of Fisheries until the loan has been repaid in full. A maximum period of 6 years is allowed for repayment of these loans. The following criteria have been laid down in the selection of beneficiaries:

(a) They must be skilled industrious and enterprising fishermen who are prepared to use new methods and gear. New

comers must be energetic persons of enterprise and pioneering skill.

(b) They must be sufficiently outstanding among the fishermen to give the initial leadership and filip necessary to further the programme of mechanization among their fellow fishermen.

INDIA

Fifth Meeting of the Standing Fisheries Research Committee

The 5th Meeting of the Standing Fisheries Research Committee was held on 3-5 July 1958 at Srinagar. The Committee made the following observations, decisions and recommendations:

I. High Altitude Fisheries with Special Reference to Trout Culture

a. Trout Culture

Having considered different aspects of Trout culture in various parts of India the Committee recommends that efforts should be made to develop Trout fisheries on improved lines in Kashmir, Himachal Pradesh and other suitable regions in the context of tourist and sporting interests.

Considering the urgent need for investigations on various problems in connection with the development of Trout and other high altitude fisheries the Committee recommends that a Research Unit be established at a suitable centre.

The Committee recommends that technical assistance may be obtained for training and expert advice for introducing improved technique for trout fishery management.

The Committee noted the possibility of experimental introduction in Kashmir of a new strain of lake trout (Splake).

b. High altitude fisheries other than trout

Considering the reported decline of the indigenous species constituting the high altitude fisheries the Committee recommends that effective measures be adopted by the State Governments to protect these fisheries after obtaining relevant information. Uniform rules and regulations for their conservation may be adopted in the adjoining States.

Considering that the Mirror Carp has proved successful in different high altitude areas, where it has been experimentally introduced, the Committee recommends that efforts may be intensified for its propagation in suitable waters.

Considering the risk of adverse effects on the indigenous species of fish the Committee does not favour the introduction of any exotic species of fish other than those already authorised.

Considering the importance of Mahaseer Fishery in the high altitude areas the Committee recommends that intensive investigations on the bionomics and status of this fishery be undertaken by the States and Central Fisheries Research Centres and that the Zoological

Survey of India may undertake the taxonomic study of different species of Mahaseer.

2. Introduction of Common Carp

Having reviewed the work on the Common Carp (*Cyprinus carpio*) at the Central Inland Fisheries Research Station, the Committee recommend that these investigations be continued but the distribution of this exotic fish to other areas should be withheld till fuller details of its bionomics are available to the Committee.

3. Tilapia Culture

Having reviewed the work on *Tilapia* the Committee recommends that these investigations be continued specially with reference to its yield per acre when cultured alone and in combination with Major Carps and other culturable species of fishes.

The Committee further recommends that experiments may be carried out in areas, where introduction of *Tilapia* has been permitted, to determine the suitability or otherwise of combined culture of *Tilapia* and Murrel or other culturable predaceous fishes.

4. Paddy-cum-Fish Culture

Having reviewed the reports on work on paddy-cum-fish culture in the country and noting the encouraging results obtained in Bihar, the Committee recommends that more intensive work on rearing fish in paddy fields should be statistically designed and carried out in Bihar and other States where requisite facilities are obtainable.

5. Co-ordination of Fisheries Research

The information collected on fisheries research carried out by the various Universities and States for dissemination among the members was incomplete and it was decided to collect further information.

In regard to the coördination of fisheries research, the Chairman informed the Committee of the action taken after the last meeting and referred to the two meetings held—the Centre Fisheries Research Stations Workers' Conference at Mandapam and the meeting of various fisheries research agencies in Bombay for co-ordination of research in that area. The recommendations of the Research Workers Conference at Mandapam were examined and endorsed by the Research Committee. It was suggested that for better co-ordination regional meetings should be held and that members from the particular region may be co-opted for the purpose. Such meetings may be arranged immediately before the Standing Fisheries Research Committee meetings and necessary information collected in advance by the Secretary.

The Committee recommended that the next meeting of the Standing Fisheries Research Committee be held at Trivandrum sometime in November, 1958.

Experimental Deep-sea Fishing

The Government of India had decided to pool together the new types of large mechanized vessels, 14 of which are with States and seven with the Centre, for experimental fishing in deep-sea waters. The fishing vessels will be grouped into four fleets, one each to be

established at Bombay, Cochin Tuticorin, and Visakhapatman, for systematic exploration of the seas for off-shore fishery resources in their respective regions.

The organization of experimental fishing on a regional basis will, however, be flexible enough to allow fishing vessels to be moved from one centre to another, particularly when these cannot be operated because of monsoon or bad climatic conditions. This will not only ensure fuller use of fishing vessels but also encourage commercial fishing by state, co-operative or private agencies. The total cost of the scheme, to be implemented in April 1958, is estimated at Rs. 31.22 lakhs.

Carp Fry Distributed in Orissa

In Orissa State, nearly 650,000 of selected fingerling of carps were distributed to the 'Gram Panchayat' tanks during August 1958 as against 470,000 during the previous year.

Experiments on inducement of spawning by pituitary injections indicated that fish could be bred successfully in confined waters with the help of pituitary hormone. The technique for hatching out the eggs has to be developed before this method of production of pure seed can be commercialised.

Fishermen Co-operative Societies in Madras State

Organization of Co-operative Soeieties

Co-operative societies for fishermen, inland and marine have been organised under limited liability basis with the object of acquiring and holding water courses such as rivers and tanks by purchase or lease for catching fish by members jointly or individually; to purchase or hire modern craft and tackle for increasing the catches by deep sea fishing; to purchase or hire quick transport vans for better marketing of fish and for the joint sale of their products. There are 179 Fishermen's Co-operative Societies in Madras state.

Organization of Co-operative Federation

To develop the activities of the Fishermen's Co-operative Societies, settle matters of common interest such as procuring facilities, purchasing of yar, logs, boats etc. and in common to act as agents of the societies, central organisations called District Fishermen's Co-operative Federations have been started at Madras, Tanjore, Ramnad, Tuticorin and Kanyakumari. A Federation for south Arcot District has been registered and will be started soon. A federation of inland societies in Chingleput and North Arcot Districts is under organisation. One of the main objects of the federations is to provide facilities for modern methods of marketing which will include quick handling, quick transport, preservation of fresh fish etc. The societies selected have contributed between Rs. 600 to Rs. 1,000 each as share capital to the Federations. In addition to the above share capital, Goverment have also granted share capital loans of Rs. 2,000 to each of the Federations which are repayable after 5 years in ten half yearly instalments.

Assistance to the Societies:

The fishermen in Madras State are mostly poor and many of them are indebted to money lenders, merchants

and middle men within or outside their community. In their poverty and indebtedness, many fishermen are unable even to own a country craft or tackle, not to speak of any modern equipment for fishing. With a view to relieve them of their indebtedness and to provide them with crafts and tackles, a scheme was drawn and approved by the Government. This scheme provides for the grant of long term ten-year loans to the fishermen through Fishermen's Co-operative Societies for the following purpose.

1. (a): for clearing partly their prior debts to money lenders,

   (b): for mainly purchasing fishing equipments, such as craft and tackle and other requistes for fishing.

2. (a): for purchasing motor vehicles for transport of fish,

   (b): for purchasing or constructing buildings such as godowns, curing sheds and tanks for storing or processing of fish or fish products, and

   (c): for purchasing, constructing and for erecting machinery, plant or other appliances for demonstration of improved methods of fishing and for the preservation, processing or marketing of fish or fish products.

Fishermen, who are members of registered Fishermen's Co-operative Societies only are eligible for these loans.

Under the scheme each society has been granted loans for 40 members not exceeding Rs. 500 per members or Rs. 2,000 per working unit and not exceeding Rs. 20,000 per society. The loans are granted to fishing units, comprising generally of three or four members, on the personal security of two or more solvent members or on the mortgage of unencumbered immoveable property belonging to the borrower or borrowers. The fishing implements such as craft and tackle purchased with the loans are mortgaged to the Society. The craft and tackles for the purchase of which the loans have been issued are to be purchased within one month from the date of issue of the final instalment or within 3 months from the date of issue of the first instalment; which ever is less. Loans amounting to Rs. 270,000 were disbursed to 26 Fishermen Co-operative Societies and 832 fishermen were benefitted by the loans in 1966-57. Out of this loan, a portion has been utilised by the fishermen for discharging of prior debts and a major portion has been utilised for purchasing crafts and tackles. A short term loan of Rs. 15,000 was also given to Periathalai Fishermen Co-operative Society as a relief measure to tide over difficulties caused by failure of fishing season.

A Fishermen's Co-operative Marketing Society was organised and started on 7 October 1956 at Mettur Dam in Salem District. There are about 313 members with a paid up share capital of Rs. 1,755. For managing the affairs of the Society and to attend to marketing of fish, writing up accounts, the services of one Senior Inspector at the disposal of the Society free of cost. Loans amounting to Rs. 13,500 were issued to 118 members for discharging prior debts and for purchasing craft and tackle during 1956-57. 243 members took licence for fishing in the Reservoir during 1957-58 and all the licencees were members of the society.

They have been marketing their entire catches through the society from April 1957.

For the second year of the Second five year plan (1957-58), the Government sanctioned the following loans and subsidies.

1. Long term loans to 20 Fishermen Co-operative Societies at the rate of Rs. 12,000 per society repayable in 10 years ....Rs. 240.000
2. Long term loans to two Federations at the rate of Rs. 2,000 per federation 4,000
3. Long term loans to Co-operative Societies and Federations for construction of godowns, curing sheds etc. at the rate of Rs. 2,000 per society or federation 25,000
4. Medium term loans to fishermen at the rate of Rs. 200 per member repayable within 5 years 40,000
5. Subsidy to Co-operative Societies and Federations for construction of godowns etc. at the rate of Rs. 2,000 per society or federation ..25,000

Housing for Fishermen

Under the Harijan Welfare Scheme a subsidy of Rs. 14,000 has been sanctioned for constructing 28 houses in Kasikoilkuppam in Chingleput District, where 28 fishermen lost their houses in a fire accident. According to the scheme, the cost of a house excluding the site is Rs. 750 out of which Rs. 500 is given as subsidy. The balance is contributed by the beneficiary in cash or in the shape of labour. The local Fishermen Co-operative Society has undertaken the construction of all the 28 houses on behalf of the 28 fishermen who are all members of the Society.

Distress Relief Fund

A scheme for the constitution of the fihermen Distress Relief Fund is implemented through Fishermen's Co-operative Federations. The object of the Fund is to grant relief to a member or members of the Fishermen's families who meet with accidents disabling them totally to carry on the profession or causing death while engaged in fishing. The members who join the fund or their families are eligible for cash relief not exceeding Rs. 250 in each case.

In addition to the financial aid given by Government, the District Co-operative Central Bank also extend credit facilities for periods of one to three years.

INDONESIA

The following is reproduced from the Quarterly Report, April-July 1958, on the biological investigations carried out by the Sea Fisheries Service of Indonesia.

Rastrelliger Research

Investigations in Central Jave were specially conducted on the feeding habit of the *Rastrelliger*. At regular intervals

5-10 specimens were taken for stomach analysis. During the second quarter of 1958 only samples of the *Rastrelliger neglectus* were taken. The stomach contents consisted mostly of phytoplankton, especially diatomae of the following species: *Coscinodiscus*, *Pheurosiama*, *Thallasiothrix*, *Chaetoceras* and *Rhizosolena*. Zooplankton was also found; a large number of the very fine Copepoda species was also found, while other species like e.g. Lamellibranchia (larva), nauplius larvae, Polychaeta, *Salpa*, Echinodermata (larva), *Evadne*, *etc.*, were scarcely found. A certain amount of fish eggs were always found.

These investigations are being continued.

Tuna Longline Experiments

A special report was finished on tuna fishing experiments with the longline in the waters of several parts of Indonesia during the period 1954-1957, comprising the following subjects:

1. The different tuna species caught with the longline.
2. Efficiency of longline-fishing.
3. Gathering places of the fish shoals and the theory of locating them.
4. The sale and preservation of the catch.

Besides, a description is also given of the craft and gear used.

'Lajang' (Decapterus russelli Rupp.) Fisheries

Study of the lajang fisheries is mainly carried out on samples obtained from Djakarta Wholesale Fish market.

According to this study there was no continuous lajang production; it might be even said that there were hardly any specimens found early in the year.

At the end of May and at the beginning of June, people began to catch lajang together with 'lemuru' (*Clupea leiogaster* C.V.) and 'selar' (*Caranx* spp.). The lajang was still in a very young stage (5-10 cm. long). At the end of June, several lajangs 12-13 cm. long were also found in a mixed catch.

As soon as the lajang catch became steady, control on the catch was conducted every 4 to 5 days.

Due to lack of suitable time no research has been conducted at the fishing site.

Shrimp Fisheries

During the months April and May 1958 trawl experiments have been conducted with the *Muna* (trawling vessel) operating in the Riau Archipelago, on the East coast of Sumatra and the Lampung area.

Efforts have also been made to carry out shrimp samp sampling at the auctions and to collect shrimp species.

Priority was given to determination of shrimp species during the trip. In the first quarter, special attention was given to the penaeid species; during the second quarter however, the palaemonid species got the priority, besides that, investigations on the penaeid were continued.

The following species of shrimps have been identified in Indonesian waters:

Penaeus: *P. latisulcatus* (Kishinoye)
Parapenaeopsis: *P. cornutus* (Kishinoye)
P. hardwickii (Miers)
P. gracillima (Naboli)
P. sculptilis (Heller)
Solenocera: *S. subnuda* sp. nov.?
Palaemon: *Palaemon* (*Exopalaemon*) *styliferus* (H. Milne Edwards).

Some of the palaemonid species, however, have not been identified yet. Besides, preparations have also been carried out to compile a key for the determinations of shrimps, and the distribution of all the species. Efforts have also been made to compile a report on shrimp fishing and its possibilities.

Culture of clams

A list has been completed containing descriptions of clams found along the coast of Java, which will be sent to Australia for comparative study. Investigations on clams of species found in the Surabaja area has produced the following conclusions:

A. Fishing Method

1. Fishing is carried out during the off times.
2. The fishing ground is at about 2-3 hours sailing distance from the village.
3. A primitive dredge called 'garit' is used for collecting the clams.
4. Fishing is carried out in waters about 10 metres deep, with bottom composed of sand and mud.
5. The fishing season coinsides with the rainy season.

B. Biology

1. Clams found in this area are:
   1. *Anadora maculosa* (majority).
   2. *Trachicardium* sp.

Besides the two species mentioned above, other kinds of bi-valves are found in Madura (Kendjeran), i.e. 'lordjo' (*Solen gouldi* Conrad?) caught in large quantities in the rainy season and 'simping' (*Placuna placenta* Linne 1758).

2. Stomach analysis has shown many Diatomae and Dino-flagellata, among others:
   Pleurosigma sp.
   Thallasiothrix nitschiodes,
   Th. longgisima
   Rhizosolenia alata
   Halospera sp.
3. Investigation on the gonads an *Anadora* has shown that:
   a. Every ovary investigated has shown no compact eggs.
   b. Specimens with the dimensions of:

      1.8 – 3.9 cm. high and 2.1 – 5.2 cm. long have sperms, while specimens of larger dimensions have ovaries.
      It seems that a sex reversal is possible, but no confirmation could be made.

JAPAN

Japan catches 18% of World Fish Landings

Japan not only continues to be the world's foremost fishing country but is actually widening the gap between her and the second country, the United States (including Alaska), according to the latest edition of the FAO *Yearbook of Fishery Statistics* (Vol. VII), just

published by the Food and Agriculture Organization (FAO), Rome, Italy. In 1957 Japan caugt 5,399,000 metric tons of fish, or just over 18% of the world total catch. USA caught 2,741,100 tons or a little over half the amount caught by Japan. Indeed, the development of the Japanese fishing industry is one of the outstanding features of the world fishing scene. Before the war (1938) Japan caught 3,562,000 tons. The catch was, of course, much less during the war years but by 1947 it had started to increase again and reached 2,205,700 tons in that year. Since then there has been a substantial increase each year, passing 3,000,000 tons in 1950, 4,000,000 tons in 1952 and 5,000,000 tons in 1957.

This rapid and impressive progress reflects the far-reaching enterprise of the Japanese fishing industry. Japanese fishing boats are operating from the Antarctic to the North Pacific and the coasts of Alaska. Japanese fishing companies are concerned in the development of fisheries in the Argentine, Chile, Brazil, Cuba and else where in Latin America, as well as in Ceylon and other countries of Asia. They are also operating fleets of vessels off the coast of West Africa and elsewhere, as well as, of course, exploiting as fully as they can the rich coastal waters of Japan itself.

Discovery of Pacific Albacore Tuna spawning grounds

One of the great mysteries of nature has been the whereabouts of the Pacific spawning grounds of albacore – the choicest variety of tuna and a migratory surface-feeding type of fish found far from land.

Japanese fishery researchers now claim that the mystery has been solved. A fishing vessel operating along the equator somewhere west of the Gilbert Islands recently caught swordfish whose stomach contents included newly-spawned albacore. (*Pacific Islands Monthly*, April 1958).

Japan provides training facilities to Foreign students

Five students from the Indo-Pacific region sponsored by the Colombo Plan were receiving training in fisheries in Japan. There were:

Mr. Vanich Varikul, Department of Fisheries, Bangkok, Thailand (May to October);

Mr. Samran Dhamrongrat, Department of Fisheries, Bangkok, Thailand (May to October);

Mr. Suhardi Pontjoprawiro, Balai Penjelidikan Perikanan Darat, Djakarta, Indonesia (May to October);

Mr. Wu Chee Meng, Fisheries Division, Singapore (May to October); and

Mr. Thakar Dharam Singh, Fisheries Officer, Punjab, India (August 1958 to January 1959).

The training was primarily being supervised by Dr. Katsuzo Kuronuma, Chief, Freshwater Fisheries Research Laboratory, Tokyo, Japan and Chairman of the Indo-Pacific Fisheries Council, 1956-1957. The subjects of study included fish culture, and fisheries management in rivers, lakes and other natural fresh waters in Japan, with particular reference to scientific researches in these fields. In addition, each student was assigned a particular problem to investigate: the growth of fish for Mr. Wu;

measurement of fish production in ponds for Mr. Samran and Mr. Suhardi; plankton for Mr. Varikul; and fish production in reservoirs for Mr. Thakul.

The training at the Freshwater Fisheries Research Laboratory was supplemented by visits and discussions at Fisheries Universities, Prefectural Fisheries Stations, and private farms as well as by frequent field trips.

In addition to the above five students, two Vietnamese workers in freshwater fisheries, Monsieur Cao-Thien-Buu and Le Van-Dang also visited the Fresh-water Research Laboratory during their study trip to Japan under ICA programme in June-July 1958. There are more Asiatic students visiting Japan and working in fields other than fisheries laboratories. Their programme of study is directed by the Fisheries Agency, Japan.

Japanese private firms sponsor training of Philippinos

Sponsored by four Japanese private firms, 7 students from the Philippines Bureau of Fisheries and College of Fisheries received training in Japan in various fields of fisheries during July-December 1958. These firms were 1) The Miho Ship-Building Yard Co., Ltd.; 2) The Nippon Gyomo Sengu Kaisha Ltd.; 3) The Akasaka Iron Works Co., Ltd. and 4) Kaijo Denki K.K. The trainees and their fields of training were: 1) Mr. Juanito Malig-Ship Building; 2) Mr. Ignacio Fernandez-Fish Processing; 3) Mr. Simeon Ventura-Synthetic Fiber Net Making; 4) Mr. Ernesto Quetulio-Synthetic Fiber Net Making; 5) Leonardo Sartorio-Marine Engines; 6) Mr. Eligio Aben-Marine Engines, and 7) Mr. Pedro Sims-Fish Finders. The training programme was organized and planned by Mr. T. Suzuki, FAO/ETAP Fisheries Officer, assigned to the Philippines.

MALAYA

Fish Landings

Fish landings for the various areas during the last quarter of 1959 were:

State	4th Quarter 1957		4th Quarter 1958	Total for Year 1957	Year 1958
	Piculs		Piculs	Piculs	Piculs
Perlis	5,168		9,225	23,525	37,104
Kedah	22,839		12,270	68,595	59,833
Penang	22,722		21,803	86,469	89,072
Perak	126,046		133,816	564,452	626,767
Selangor	75,963		72,350	280,279	331,975
N. Sembilan	1,433		1,555	5,104	7,056
Malacca	13,448		14,893	54,189	62,508
Johore	52,532	+	36,357	271,808	ø207,245
Pahang	37,068		31.267	199,700	135,162
Trengganu	39,640	X	24,077	210,609	X 168,848
Kelantan	18,590	X	11,496	97,773	X 87,175

+ Includes only October landings in West Johore and October / November landings in East Johore.

ø Includes landings up to October in West Johore and up to November in East Johore.

X December figures not included.

The last quarter of 1958 has been a very disappointing one for the fishing industry. It was hoped that the pre-monsoon period, October - November, in the East Coast would compensate for the poor landings in the previous months but the very early onset of the monsoon dashed these hopes and 1958 can only be regarded as a poor year. On the West Coast the picture was not quite so gloomy. Perak and Perlis had better landings than in the comparable quarter in 1957 but the other States had poor andings, the weather again being blamed although the recent actions of the Indonesian Government in arresting fishermen and in closing waters to fishermen have forced many fishermen in the South - West to severely restrict their operations.

Tuna and Shark Fishing

Mr. Momokawa, the Japanese fishing expert under Colombo Plan has carried out preliminary trials with longlines for capture of sharks. The experiments with the trial gear have indicated modifications which are necessary to meet peculiar local conditions in the Malacca Straits where sharks cause a great amount of damage to fishermen's nets and lines. The trials will continue. Tuna longlines have been set up and operations to familiarize the crew of the Departmental vessel *M.V. Kembong* with the new gear haue been carried out. During the experiments which were makeshift to a large extent, a variety of fish including one sailfish, over 8 feet in length, was caught. Full–scale experiments will commence early in 1959.

Mechanization of Fishing Vessels

One of the effects of the poor season has been that the rate of mechanization has been slowed as less money was available for purchase of boats and engines. However, good progress was made and a total of 234 engine - driven boats were registered on the last quarter of 1958. The fish landings in the quarter would have been much lower in the East Coast were it not for the large number of fair - sized motor boats now operating there as they were able to take advantage of every lull in the monsoon to carry out handline and 'bubu' fishing.

Freshwater Fisheries

A total of over 40,000 fry were distributed to various fish-ponds, reservoirs, irrigation canals and disused mining-pools throughout the Federation. This high figure would have been far exceeded had the Department been able to meet all requests for fry, particularly for "Lampam jawa" (*Puntius javanicus*), the stocks of which have been temporarily exhausted at the Fish Breeding Station at Tapah. The new ponds there will give much needed additional breeding space. In return for free supply of 'Kalui' and 'Lampam jawa' fry, one fish farmer supplied the Fisheries Department with 30,000 *Tilapia* fry for distribution as a mark of appreciation for the Department's help to him.

The clearing and stocking of mining pools is still being given priority and 23

ponds with a total acreage of 30½ acres were treated during the quarter. The pools along the Tanjong Taulang Road, Perak are particularly popular among the local anglers who supplement their normal diet with the Tilapia, 'Sepat, and 'Lampam' with which the pools have been stocked, Tilapia (3,000) and Lee Koh, Chinese Carp (1,500) fry were released in prepared mining pools in the quarter.

Two courses on fish culture were given to pond keepers in October 1958 and a survey of fish ponds in all States except Johore was completed. The experiments on pond rearing of 'Udang Galah' are continuing, but it is too early as yet to predict the outcome.

Fishermens' Training Course

The third and last course for 1958 ended on 22nd December 1958. The final results showed that although one of the 19 students failed in the Departmental Examination, *all* the students satisfied the Surveyor of Ships and passed for their Engine Driver's Certificates. It is no longer possible to arrange for the students to sit for the Helmsmen's Examination as the Marine Department is too short-staffed to be able to carry out the examinations, but the training in Navigation and Helsmanship, although not of such direct benefit to the fishermen as the training in maintenance and repair of engines, is continuing and the course as a whole is highly valued by the fishermen.

Fishermens, Co-operatives

The Co-operatives in East Malaya ceased to grant loans to fishermen during the quarter pending release of further funds by Government. The repayment of loans already made has started and two groups have already fully repaid the loans granted them. The arrangements for collective transport and marketing of the Societies' fish continued until well into November in spite of the North East Monsoon.

NETHERLANDS NEW GUINEA

Development of the Fishing industry.

New Guinea and Papua's annual imports of fish are valued at approximately £A275,000 (US$620,400), but it is hoped that eventually the Territory's entirefish requirements will be produced locally. With this objective in mind, the fishing industry is steadily being developed, according to a plan adopted in 1956.

To implement this programme, demonstrations of modern fishing gear are being given to Papuan fishermen to encourage them to use the latest techniques. In inland regions fresh-water fish, including Tilapia, are being grown.

A new fisheries research vessel, the *Tagula*—designed in Scotland and built in Brisbane—is operating off the southern coast of Papua. The vessel is 60 feet long with a beam of 18 feet and a draft of 7 feet, and has accommodations for a master, engineer, a technical staff of three, and a crew of ten. The main engine is 140 hp. Diesel, giving the vessel a cruising speed of 8½ knots with a fuel consumption of 5 gallons an

hour. Cruising range is 1,200 miles. Navigation and fishing aids comprise a two-way radio, an echo-sounder with a viewing unit and a range up to 480 fathoms.

The vessel has a refrigeration installation with a capacity for freezing one ton of fish in 16 hours and a maximum capacity of 5 tons. There is an additional holding room, without refrigerated coils, with a storage capacity of five tons (South Pacific Commission, *Quarterly Bulletin*, April 1958).

The *Tagula* is demonstrating commercial fishing techniques in Coral Sea waters to encourage private enterprise to provide adequate fish supplies for the expanding populations of Port Moresby and other centers in Papua and New Guinea.

PAKISTAN

Improvement of Craft

Quite a few changes have taken place in the construction of the fishing craft. All of these changes tend to make the fishing craft larger, stronger and seaworthy in order to accommodate engines. Fishing craft are now being constructed narrower on the bow and stern and wider amidships. This helps to increase the speed of the craft. More ribs are being provided in the vessels to make them stronger and more seaworthy.

For better control of the craft, the keel is now being extended further aft and to secure a brass skeg to which the rudder is secured. A start has also been made where fishermen are using rudder with the rudder stock extending up into the lazzaret and steering wheel is now being used in place of hand steering from the stern. Some vessels have been constructed with more flair on the bow which helps the vessel to ship in less water.

Fixed type decking is being partly built over the hatches and hatch combings are being introduced which are provided with hatch covers. The bulworks are being raised to make the craft more seaworthy and to carry more fish load. Insulated hatches are being provided for storage of fish as against the wooden boxes which were in use previously.

A Scheme to construct two fishing boats according to designs recommended by F.A.O. (vide FAO Report No. 403. The Mechanization of West Pakistan Fishing Boats, 1955) was initiated by Central Fisheries Department. The idea behind this is to demonstrate to the fishermen the advantages of the improved type of the craft. These craft are under construction at Chittagong, East Pakistan.

Thirty outboard motors (15 of 5 H.P. and 15 of 10 H.P.) were procured in 1956 as a first step for mechanizing the existing sail boats. These engines have since been distributed to the fishermen on payment by easy instalments.

Six inboard Ruston engines (3 of 75 H.P. and 3 of 110 H.P.) were procured in 1956 for mechanizing the

larger boats. These engines have since been distributed to the fishermen on payment by instalments and the craft in which they have been installed are catching more fish.

One hundred and fifty-five Danish engines (ranging from 10 to 90 H.P.) have been procured this year and are being distributed throughout the country

A net hauler was procured in 1956 for demonstrating mechanical handling of gill nets. It has since been installed on a craft and more haulers and winches are being procured next year.

Fisheries Development in West Pakistan

The West Pakistan Fisheries has recently taken a new shape in regard to administration, development, research and teaching. To be more exact, the following schemes have been sanctioned for the current year and are under operation.

1. Fisheries Department Set Up: A new Directorate of Fisheries for West Pakistan has been set up with headquarters at Lahore. It includes one Director, two Assistant Directors and eight Exra Assistant Directors of Fisheries, helped by sixteen Assistant Wardens of Fisheries, 80 watchers etc. and the necessary administrative staff. The designations of Warden and Deputy Wardens have been abolished.

2. Peshawar Division Development Scheme: A 5–Year scheme to develop fisheries in Peshawar Division has been sanctioned. It includes an officer, "Fisheries Development Officer", who will be helped by the two Fisheries Development Assistants, two Head watchers, fifteen watchers and administrative staff. The staff will be provided with a van for transport of fry and fingerlings for stocking tanks, ponds, reservoirs etc.

The staff is entrusted with only one work, development.

3. Rawalpindi Division Development Scheme: This scheme has been sanctioned entirely on the above pattern.

4. Increase in Fish Production Scheme: This scheme is being continued for a number of years in area comprising the former Punjab where during the last five years it has increased the fish production by 100%. The staff consists of one Officer helped by three Assistant Wardens of Fisheries, three Fisheries Research Assistants and three Fish-Fry Transport Vans. In addition there is the administrative and watching staff.

5. Development of Fisheries in Hyderabad Division: This scheme covers a Fisheries Research Officer who will be helped by two Fisheries Assistants, administrative and Watching staff.

6. Development of Fisheries in Mancher Lake: A Fisheries Development Officer with his staff will develop this hitherto neglected but biggest lake in Pakistan. It has immense potential resources. A tractor with a trailer will be provided for transport of fresh fish from the lake to the nearest railway station. In addition, motor boats will be provided. A ten ton cold storage will also be established.

7. Survey of Freshwater Resources in West Pakistan:

This scheme will be controlled by a Fishery Survey Officer who will conduct

survey of fishery waters in hitherto unexplored areas such as Kaghan, Swat, Chitral, Dir and other important places. He will be helped by his staff.

8. Survey of Freshwater Resources in Bahawalpur, Khairpur and Hyderabad Divisions:

The scheme will be headed by a Fishery Survey Officer for the above areas to explore new water stretches for fish farming.

9. Establishment of Fish Fry Supply Centre: Two such Centres will be established which will collect and store large number of fry and fingerlings in special tanks for supplying to the Development Officers. Two tube wells have also been provided to feed the tanks. Two jeeps with trailers will collect stranded fry from natural spawning areas around the supply centres and collect in the special tanks. The centres will also supply free of cost such fry as may be required by private farmers.

10. Investigation into Pollution of Sohan River near Rawalpindi:

A Chemist and a Biologist with their subordinate staff will work and find out the reasons for the mortality of fish in Sohan River, believed to be due to pollution. Extent of damage, effect on fish life, fish food etc. will be studied and remedies suggested.

11. Establishment of Fishery Training Centre: This scheme will be run by a Zoologist, Assistant Biologist and other staff members who will impart training to developmental officials, Village Aid Staff, private persons etc. The idea is to teach fundamentals of fish culture for fish production and also to cater for refresher courses for officers and officials.

Such in brief is the plan under operation which aims at increasing the fish production of West Pakistan by 50% in five years.

PHILIPPINES

Philippine Fisheries Development aided by intense research programme

An intense research programme, based on a research station, nine laboratories and some sixty research workers, is helping to speed up and direct the development of the rich fisheries of the Philippines.

This is the report of Dr. Klaus F.W. Tiews, a well-known German fishery biologist who has just completed a two-year assignment in the Philippines on behalf of the Food and Agriculture Organization (FAO), Rome, Italy.

"I went to the Philippines to help the Government plan a programme of research in marine fishery biology and to train Philippine workers to carry out this research", explained Dr. Tiews at an interview at FAO Headquarters.

"We have made considerable progress during the past two years", he continued. "We were able to set up a research station and nine laboratories, which are being equipped with the help of such organizations as the Colombo Plan, as well as by Project Development Funds from the Philippine Government.

The Colombo Plan organization is supplying $20,000 worth of equipment, and the Philippine Government are providing $75,000 for financing the laboratories.

"I have also been able to train some sixty research workers and counterpart assistants who are already engaged on numerous research assignments in marine bioloby", said Dr. Tiews. "All these workers are young men and women graduates from the University or from the Philippine Fisheries Technology Institute, and they are showing a great enthusiasm for the work. Eight of the more outstanding workers are being given training abroad, three by Colombo Plan fellowships, one by the International Co-operation Administration, one by a FAO fellowship, two by the German Government, and one by the Japanese Government."

The research program seeks to provide information on the biology of commercial species of fish in the Philippine waters. Studies are being made of the life history, habits, distribution, reproduction, rate of growth, and other biological factors of the fish. One of the difficulties faced in this program is the great variety of species of commercial fish found in the Philippine waters.

"The Philippines have rich resources", Dr. Tiews pointed out, "but there is no predominant species such as we know in the North Atlantic where a fishery can be based mainly on, say, herring, or some other predominant species. It is also a fact that not enough is known of the Philippine resources so that a great deal of research must be done".

A particularly important part of the work is to establish the productivity of a fishing area, especially in relation to gear and intensity of fishing effort.

"This point has come to the fore recently because of the introduction of modern types of gear and equipment", explained Dr. Tiews. "Such new gear has led to considerable increases in catch and has given rise to fears by some of the fishermen, who still use the old methods that the resources will be destroyed by over-fishing. We have been able to prove that these fears are unfounded but, of course, with the changing and developing situation, there is no doubt that such problems will often recur."

There is a need now for a fleet of research ships, probably three, and there are hopes that such vessels will be provided in the next two or three years.

Dr. Tiews will probably be called upon to return to the Philippines in about two years' time to check on the progress being made with the research program.

UNITED KINGDOM

HONG KONG

Hong Kong Oceanography

The Fisheries Research Unit, University of Hong Kong, reports that a monthly hydrological and plankton survey of local waters conducted by the F.R.V. "Alister Hardy" since March 1954 was continued until January 1956 when a revised sampling pattern was introduced with includes stations in neighboring extra-territorial waters,

especially in the fishing grounds influenced by the Pearl River. In collaboration with the Government Fisheries Division, the research vessel is also being used to conduct experiments with non-indigenous fishing gear with a view to their possible introduction into Hong Kong fisheries. Results will appear in the Hong Kong University Fisheries Journal.

The following is noted from progress report for the quarter, July-September, 1958 of the Fisheries Division, Department of Agriculture, Fisheries and Forestry, Hong Kong.

Fishing Methods and Gear

The Fisheries Division vessels were regularly engaged in otter and shrimp beam trawling in British territorial waters. Catches were generally poor, due to the excessive number of boats fishing in these waters nearly all of which would ordinarily have been operating in Chinese waters.

A small quantity of the low price British synthetic fibre "Courlene x3" was made up into a shirmp beam trawl and initial trials indicate that this will prove a very satisfactory material.

The local fishermen braid their own shrimp beam trawl nets, mesh by mesh, and it consequently requires large number of man-hours to complete one net. In keeping with the practice in Great Britain and Japan, the Fisheries Division proved that it is possible—and much quicker—to construct efficient shrimp trawls from machine made sheet netting.

Mechanization

A total of 39 mechanized fishing boats (17 of which were newly built craft) were licensed by the Marine Department. After allowing for the disappearnace of 22 former mechanized boats, most of which either reverted to sail or transferred to the motor trading boat register, the total strength of the mechanized fishing fleet as at the end of the quarter stood at 2,356 vessels.

Training of Fishermen

Twenty nine fishermen, trained by the Division, obtained certificates of competency as coxswains during the quarter.

Ten of the fourteen candidates from the 14th Engineering Class passed the Marine Department examination to become qualified fishermen Engineers. Also, four candidates from the 13th Class who had failed their examination during the first attempt passed on being re-examined during the quarter under review.

No new Skipper Training Classes were organized but one candidate from the 8th class, who had previously failed the examination, was re-examined in July and passed.

Freshwater Fisheries

Rainfall during the quarter amounted to 47.38 inches, which was sufficient to keep the water in the fish ponds of the New Territories at satisfactory levels.

Only some 1,500 piculs of locally produced pond fish was harvested, as against 1,800 piculs during the corresponding quarter last year. The decrease in production was mainly due to the shortage of grey mullet fry during the Spring, when the ponds were stocked.

Prices paid for pond fish were roughly the same as during the previous quarter.

Imports of living fresh water pond fish from China dropped from 450 to 600 piculs per day to some 250 to 300 piculs only.

No restrictions were imposed by the Chinese mainland Government on the export of fish fry from China. The licensed exporters delivered 13,735,000 fry to Hong Kong (i.e., 6,800,000 Silver Carp; 5,460,000 Grass Carp; 1,100,000 Mud Carp and 435,000 Big Head) at prices just a little higher than those which prevailed in the previous quarter. The mortality in these consignments was 27.5 per cent.

Of the 13,735,000 fry received from China, it is known that 9,758,500 were re-exported in 39 shipments, some by sea and some by air, to Taiwan, Singapore, Bangkok, Labuan, Phnom Penh and Dacca. Approximately 200,000 of the imported fry were sold locally for the stocking of fish ponds in the New Territories.

One new pond of 18 dau chung (3 acres) was constructed at Im Chi Tun, near Au T'au, and stocked with fry of the different species of Chinese carps. This brings the total area devoted to fish culture up to 3,327½ dau chung (or 554.58 acres).

SINGAPORE

Pilot Fisheries Training Project at Tg. Kling (a fishing village in Singapore)

Object

To assess the reaction of student of rural schools to and their assimilation of fisheries instruction. It is hoped that those who have completed successfully this course of instruction would be sufficiently well equipped to take up apprenticeship in offshore trawlers.

Scope

The subjects taught will include the following :-

(a) Elementary Hydrology as well as elementary marine and fisheries biology.

(b) Fish identification.

(c) Fishing methods.

(d) Net making, gear construction and repair.

(e) Building and repair of small fishing boats.

(f) Principles of marine diesel engine operation and engine maintenance.

(g) Fish preservation including quick freezing, icing, salting and canning.

(h) Oyster culture, fish culture and prawn culture.

(i) Rule of the Road at Sea.

Enrolment

Forty students who had passed out from the rural primary school were enrolled and instruction was started around mid-September 1958.

Rural Schoolboys to be Taught Scientific Fishing

The Minister for Commerce and Industry, Mr. J.M. Jumabhoy announced that his Ministry, in co-operation with the Ministry of Education, will introduce fishing and farming as exra-curricular subjects in rural school in the future.

As an experiment, the Ministry will introduce fishing as an extra-curricular activity at the Tanjong Kling malay schools at the end of the month if the response is good.

"We have started the experiment because we feel that our educational system at present tends only to produce white collar workers. The scheme, we hope, will help to preserve the equilibrium of occupations, Mr. Jamabhoy explained.

The Minister said that more rural children were thinking of "white collar jobs" because of the poverty of their parents.

"The scheme will create an interest in rural activities to the extent that they may want to pursue them as vocations when they grow up," Mr. Jumabhoy stated.

He said the children might want to consider following their fathers' footstep when they learn that modern scientific methods can help them earn a livelihood.

The Minister stated that if the experiment was successful, it would be extended to include other rural subjects like farming and animal husbandry.

"It must be remembered that this will be a long term project because we will not be able to see the fruits of the scheme until the children grow up," Mr. Jumabhoy said.

He revealed that fishing and the Tanjong Kling Malay School had been chosen because of the presence of suitable facilities and technical officers."

The classes for fishing will be held three afternoons a week. Teachers will include assistant technical officers and subordinates in the Fisheries Department.

The children will be taught hydrology, elementary marine and fishery-biology, fish identification, fishing methods, net and gear making and repairing, building and repair of kolehs, fish preservation, fish and oyster culture, fish canning prawn ponds and the rule of the road at sea. (*Singapore Tiger Standard*, Tuesday, 12 August 1958).

Training in Marine Aquarium Techniques

The City Council of Singapore has established a public aquarium, called the Val Kleef Aquarium, which is still in the course of development. As it is hoped to build an extension for the housing and display of large fishes such as sharks etc., training was requested abroad for the Superintendent of the Aquarium. Japan has met the request by providing a 6-month course of training which commenced in early May 1958.

UNITED STATES OF AMERICA

POF1 Scientific Activities September 1958

The *Charles H. Gilbert* completed cruise 41 on September 26. This cruise, which began early in August, was designed to investigate relations between skipjack and their environment, both physical and biological, and to study

skipjack behavior. In spite of the reduced abaundance of skipjack in Hawaiian waters during the period of the cruise, both of the objectives were reasonably accomplished. In addition, IGY Station 15 was occupied during the month.

During September skipjack that had been tagged off Hilo, Hawaii, in May 1958, were recovered outside of the Hilo area for the first time. By the end of the month some 22 percent of the tagged skipjack released off Hilo had been recovered. This extremely high recovery rate can probably best be explained by the fact that until this month all recoveries of these tagged fish had been made in the Hilo area, indicating that the fish had remained in this area since the tagging period in May and had therefore been subjected to a continuing fishing pressure from the Hilo skipjack fleet. Presumably the skipjack had become pocketed by some environmental situation which induced them to remain in the Hilo area for the summer. In September of 1957 some 3,200 small skipjack were tagged off Hilo. Recaptures of these tagged fish have shown a rather different pattern than the ones tagged during May of 1958 in that recoveries have occurred at a number of localities throughout Hawaiian waters. There have been some 10 recoveries during the past 3 months, the latest recovery being on September 19, 1958, The estimated weight of these fish at the time of their release was about 4 pounds, while the weight of the latest recoveries is about 15 pounds, giving an estimated growth increment of some 11 pounds for the period of a year. Considering the accuracy of the method of estimating growth by tagging and that derived from length frequency studies, the two methods give essentially similar results indicating that skipjack grow quite rapidly and, in view of the small size attained by this species of tuna, probably have a relatively short life span.

In view of the apparent success of the pilot plant commercial tilapia bait rearing project at Paia, Maui, an experimental tilapia rearing plant was established at our Kewalo docksite headquarters in August to investigate the effects of various diets on the rate of production of young and the effects of various sex ratios also on the rate of production of young. This plant produced about 54,000 young fish in September, and the results already obtained relate in an interesting way to the various factors being tested. Sex ratios of 1:2 and 1:3 (males to females) have been highly productive, whereas ratios of 1:4 and 1:6 were not. In addition, concentrations of 30 and 50 adult fish per tank of about 50 sq. ft. bottom area produced many more young than 70 or 90 fish per tank. Of the three feeds being tested, one appeared much better in terms of young fish being produced than the other two. While conclusions based only on a single month's operation can hardly be considered final, nevertheless these results indicate that the experimental design is sound and that the variables being investigated are of real significance in the design of any commercial tilapia bait rearing project. It is of interest that the particular sex ratios chosen for the Paia plant, a ratio of 3 females per male, seems to be one of the better ratios as indicated by the Kewalo experiments. Additionally, the food chosen for the fish at the Paia plant seems to be one of the better foods

insofar as giving a high production of young fish.

October 1958

Beginning late in 1955 and continuing through the middle of 1958 a number of introductions of the Marquesan sardine, *Harengula vittata* (Cuvier and Valenoiennes), have been made to Hawaiin waters. There have been seven such introductions all together about the island of Oahu with 3,000 to 53,000 fish released in an introduction. There had been a few recoveries of the Marquesan sardine following their release in Hawaiian waters, and these recoveries could be without exception credited to the original releases. However, in late summer and fall of the present year, a series of recoveries were made from the islands of Kauai and Maui, and the individual sardines recovered were in some cases much too small to be derived from any of the original releases. These recoveries seem to provide rather solid evidence that some successful spawning of the Marquesan sardine has occurred in Hawaiian waters and that the possibility of this species establishing itself in Hawaii now seems promising. A successful transplantation of a purely marine species of fish from one place to another has long been an intriguing possibility to fisheries investigators. For this reason the future history of the Marquesan sardine in Hawaii will be followed with a great deal of interest.

Skipjack from Hawaiian waters tagged with the POFI dart tag during 1957 and 1958 continued to be recovered during the month. Eleven of the total of 12 recoveries showed random movement within the fishery. The other recovery was of particular interest in that it provided additional information on the rate of growth of these tuna. This fish was tagged and released off Hilo, Hawaii, early in September 1957. When captured near the end of October, its weight had increased from an estimated 4 to 18 pounds, a growth rate of about a pound per month. There has been at least one recovery of tagged skipjack each month since the release of the 3,200 tagged fish in September 1957. The highly successful dart tag employed in this program is described in the October issue of California Fish and Game in "An all-plastic dart-type fish tag" by Daniel Yamashita and Kenneth Waldron.

Production of fry at the Maui tilapia plant totalled 57,000 during November. This is about one-third of October's production and indicates that the adult fish are reacting to a drop in temperature by a reduction in spawning activity. This month the Maui plant reached its production goal of 1,000,000 young fish.

The Kewalo Basin tilapia plant produced 18,300 fry during the month, but mortalities accountad for 3,218 young. Deaths were attributed to infectious pancreatic necrosis, a possible virus diseases for which there is no known remedy. Our experiments on concentration and sex ratio of the brood stock indicated that an allotment of 4 square feet of pond bottom for each male and a ratio of 3 females for each male resulted in the maximum number of young.

The October 11-20, 1958 surface temperature charts, completed during November show the following characteristics in the anomalies from 1957. The cold

anomaly in the area north of 35°N. between 140° and 170° W. is still present but the areas of positive anomaly to the east and west appear to have intensified somwhat. This was particularly true of the coastal area. The anomalies from the 30-year meaa showed that the cold anomaly which had been present in the offshore area between 40°N. and 50°W. latitude had been almost entirely replaced by a slight warm anomaly. This and the anomalies from 1957 indicate that the seasonal cooling may not be progressing as rapidly as during 1957.

One publication, Fishery Bulletin 134 "Analysis of the catch statistics of the Hawaiian skipjack fishery" by Daniel Yamashita, was issued in November. This report contains a historical review of the catch statistics from 1900 to 1953 together with an an alysis of the accuracy and scope of the available records.

Two albacore tag recoveries were reported during the month, bringing POFI's albacore tag recovery total to 16 (1.3 precent recovery rate). The 15th recovery was made by the albacore boat Mable from Torrance, California, on July 21, 1958, at 34°00'N., 122°10'w. This fish had been tagged on November 21, 1956, by the Charles H. Gilbert at 35°21'N., 1230 57'w. Thus, this fish made a net movement of only 130 miles in 607 days within the area of the west coast fishery. The last recovery (16th) was made from the boat Daiho II during the trip of August 12-29 1958. This. fish had been tagged on November 16, 1956, by the Gilbert at 36°48'N., 127°33' W., and when retaken at 32°38'N., 123°00' W., it hat been at libertyfor about 640 days and hat travelled a net distance of 345 miles within the west coast fishery.

November 1958

The Charles H. Gilbert returned to Honolulu on November 17, 1958, after about 6 weeks at sea during which time the behavior of tuna was studied, Although the first half of the cruise, conducted in local waters, accomplished little because of the scarcity of tuna schools, the second half of the cruise spent in the vicinity of the Line Islands was considered highly successful. During this secod phase 69 fish schools were sighted, 38 of which were positively identified as skipjack or yellowfin.

Observations made from the submerged caisson gave POF Iscientists their first opportunity to study the actions of yellowfin and compare their behavior with of the skipjack. In general, the two species seem to school and feed in much the same manner, with yellowfin swimming slightly deeper than skipjack. Experiments were conducted on the effects of water sprays, lampblack dye, and mullet chum, but the results have not been evaluated.

The *Hugh M. Smith* returned to Honolulu on November 11, 1958, after about 5 weeks at sea testing a new midwater trawl and conducting plankton and other oceanographic observations in the equatorial Pacific. The new trawl, of the Nanaimo type developed by the Fisheries Research Board of Canada, is being tested by POFI as a means for sampling tuna forage organisms. Catches were relatively small in volume but they did contain, in addition to a great variety of interesting bathypelagic fishes, many of the items that tunas eat; even some of the very fast-moving squids. Of per haps greater importance were the relatively large numbers of juvenile tunas in the catch—more than

POFI has taken by any other sampling method. There were 33 skipjack, 2 yellowfin, and 4 frigate mackerel between 3/4 inch to 2 inch in length. Most of the skipjack juveniles were taken during the day while the other two species were taken at night.

Commercial landings of skipjack in Hawaii continued a seasonal decline, with landings in November being unusually low. However, comparable data show to the end of November an increase of half a million pounds landed in 1957 as compared with the very poor 1957 season. Five tagged skipjack were returned to POFI during the month, all short-term recoveries showing little net movement. Four of these in June 1958 near Lanai and recovered in that vicinity. One was released in August 1958 near Lanai and recovered off Oahu. Recovery of tagged skipjack now amounts to 114. percent of the 1958 releases.

Production of fry at the Maui tilapia plant totalled 57,000 during November. This is about one-third of October's production and indicates that the adult fish are reacting to a drop in temperature by a reduction in spawning activity. This month the Maui plant reached its production goal of 1,000,000 young fish.

The Kewalo Basin tilapia plant produced 18,300 fry during the month, but mortalities accounted for 3,218 young. Deaths were attributed to infectious pancreatic necrosis, a possible virus disease for which there is no known remedy. Our experiments on concentration and sex ratio of the brood stock indicated that an allotment of 4 square feet of pond bottom for each male and a ratio of 3 females for each male resulted in the maximum number of young.

The October 11-20, 1958 surface temperature charts, completed during November show the following characteristics in the anomalies from 1957. The cold anomaly in the area north of 35°N. between 140° and 170°W. is still present but the areas of positive anomaly to the east and west appear to have intensified somewhat. This was particularly true of the coastal area. The anomalies from the 30-year mean showed that the cold anomaly which had been present in the offshore area between 40°N. and 50°W. latitude had been almost entirely replaced by a slight warm anomaly. This and the anomalies from 1957 indicate that the seasonal cooling may not be progressing as rapidly as during 1957.

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Fishermen in American Samoa learning long-line tuna fishing technique

The Native American Samoans are learning the long-line method of tuna fishing which the Japanese have successfully developed. A former naval 50-foot tender has been made available for project, and the Samoan fishermen have demonstrated their ability to catch big fish on a limited commercial scale. The only limit now seeme to be imposed by their boats and fishing gear, and it has been rumored that the idle *M/V Samao* may be leased by the Government of the American Samoa for use as a fishing vessel.

The Samoan crew fishes off Tutuila, in sight of land, and disposes of its catch

by selling tuna to the local cannery, and other types of fish are sold in Pago Pago direct to the local population for 10 cents a pound.

The Governor of American Samoa takes a close personal interest in the possibility of developing commercial fishing as a major Samoan industry. He has arranged permission to appoint each year a candidate from American Samoa to the U.S. Maritime Academy in New York on a full scholarship basis with all traveling and tuition expenses paid. This programme should provide qualified Samoan masters of future fishing vessels.

Looking beyond the Samoan group, the Governor sees the possibility of Fijians, Tongans, and other South Pacific Islanders joining in a large scale commercial-fishing operation, reaping direct benefit from the valuable fish which abound in their waters.

A substantial amount of fish is being caught by Japanese fishermen in South Pacific wrters for sale to the American Samoa cannery operated on a lease basis by a large United States west coast canner. The Governor feels that the Samoan people should have an opportunity to share in their growing industry.

The fishing industry has been a great boon to American Samoa. The Pago Pago cannery employs between 350 and 400 local people in the processing and packing of the tuna which 30 to 40 Japanese fishing vessels deliver to the cannery regularly.

The cannery's payroll is estimated to contribute a quarter of a million dollars annually to American Samoa's national income. More than any other factor, the cannery operation gives back to American Samoa the propperity it lost when the U.S. Navy closed down its base in Pago Pago in 1950. (*Samoa Bulletin*, March 28, 1958.)

THAILAND

Thailand's Record Fish Catch in 1957

Thailand's fish catch of 234,500 tons made in 1957 is a recrod total for the country, according to the edition latest of the FAO *Yearbook of Fishery Statistics* (Vol. VII), just publiby the Food shed and Agriculture Organization (FAO), Rome Italy.

The previous best catch was 229,800 tons in 1954. During the past five years Thailand has annually caught more than 200,000 tons, the average for this five year period being 220,000 tons per year. This figure compares with a pre-war yearly catch of about 161,000 tons (1938).

FAO ACTIVITIES

Staff Movements

Dr. Rudolph Kreuzer *(Germany)*

arrived at Headquarters on 15 September 1957 to assume the post of Chief, Fish processing Section, Fisheries Thechnology Branch. Prior to joining FAO, Dr. Kreuzer was Technologist/Bacteriologist at the Institut für Fischverarbeitung in Hamburg, Germany.

Fourth FAO Regional Conference for Asia and the Far East

The 4th FAO Regional Conference for Asia and the Far East was held at Tokyo, 6-16 October 1958. Member Governments represented were:

Australia	
Burma	Federation of Malaya
Cambodia	Netherlands
Ceylon	New Zealand
France	Pakistan
India	Philippines
Iran	Thailand
Japan	United Kingdom
Korea	United States
Laos	Vietnam

Observers were present from the International Office for Epizootics (OIE) The Holy See, the United Nations and the world Veterans Federation.

The FAO team, 19-Strong, was led by the Director-General of the Organization, Dr. B.R. Sen

The Conference paid considerable attention to certain fisheries matters. Given below is a resume of the deliberations relevant to fisheries matters at this Conference.

Need for Fishery Statistics

There was general agreement that the widespread lack of adeqate statistical information constituted one of the greatest practical difficulties in the planning and execution of fisheries programs. It was emphasized that reliable information concerning not only the size, composition and volume of catches but also concerning the distribution and price behaviour of fish products, the number and types of fishing craft, the social and economic conditions in fishing communities and the characteristics of the fish stocks themselves all formed an essential basis for realistic planing.

Problems of Assembling Fishrey Statistics

Problems arising in the collection of fishery statistics in different secters of the fishery industries, could be traced generally to two primary causes. One was that in much of the region the fishing and fish distribution operations were small-scale, numerous, and widely dispersed over thousands of miles of coastline, river systems and inland waters. In many areas, the operations were always of a subsistence character, and there were, for example, no records, even by quantity, of the catches and no apparent means of determining their value.

In certain countries the situation could be met only by the use of well devised sampling systems, and in this connection reference was made to the important economics of effort associated with sampling. In the case of Philippines reference was made to the geographical diffusion of fishing operations among many islands and small fishing centres and to the problems of statistical collection where, for practical purposes, administrative responsibility had to be shared between the central Bureau of Fisheries and the large number of municipal authorities. In the case of Japan where considerable experience had been gained in this field, systems appropriate to more centralized landing and marketing organization were described.

Reference was also made to the limitations of sampling due both to the continual catching of fish in contrast to the short period of harvesting in agriculture, and to the variegated pattern of fishing operations for which it was not always expedient to make short term

adjustments in the design of samples, especially where the routine were not delegated to local authorities.

It was concluded therofore that there were serious technical difficulties in dealing with situations where for practical purposes complete enumeration was rarely feasible.

The other main cause of problems in the assembly of fishery statistics was the acute shortage of qualified personnel at all levels, and a number of delegates referred to the need for more extensive training.

Efforts to Improve Fishery Statistics in the Region

The above problems had been well recognized for a number of years and the governments had endeavoured by various means to improve their methods of collecting fishery statistics. Reference was made to the FAO training centre in fishery statistics conducted in Bangkok, 1952, and to systems now in use in various countries.

However, it was concluded that with some notable exceptions progress had been slow. FAO's own efforts had been limited by the fact that until quite recently very little experience had been gained in dealing with the characteristic problems of fisheries in this region. The experience of the more highly advanced fishing countries was very difficult to apply because it reflected higher levels of education and training both among field staff and within the fishing industry itself, while commercial organization also permitted much more extensive use of complete enumeration.

In recent years, however, greater attention had been given in Japan and India to the use of sampling methods in fisheries and these had been simplified and adapted to conditions commonly found in the fisheries in many parts of the region.

FAO Indo-Pacific Training Centre in Fishery Statistics

In the light of experience gained and in response to recommendations by its Indo-Pacific Fisheries Council, FAO had arranged to conduct a regional training centre in fishery statistics to be held in Bombay, 7 February–24 April 1959.

The Conference strongly endorsed the need for such a centre and a number of delegations expressed their wish to participate.

Current fish marketing situation

The general conclusions reached by the Ninth FAO Conference concerning food marketing were considered to apply with particular force to fish products. These referred to the importance of higher producer incomes through reduction of marketing costs, the need for adjustments to meet changing demand resulting from higher purchasing power and urbanization, the close inter-dependence of different phases of the marketing chain, especially for perishables, the fragmentation of marketing operations and the resulting opportunities for exploitation by intermediaries, the inadequacy of storage, processing and transport facilities and of dissemination of reliable marketing information.

Some special problems in fish marketing were also discussed and these could be traced primarily to the characteristic seasonal and spasmodic fluctuations of supply; the small size, number, diffusion and geographical remoteness

of fishing centres; the extreme perishability of fish as a commodity; the special disadvantages of tropical weather and inadequate transport facilities and the fact that, as a rule, fish products while important from the nutritional standpoint occupied a very small share of total food marketing.

In this situation the middlemen had achieved a strong, deeply entrenched position amounting in most cases to the monopolistic exploitation of narrow bottlenecks which militated powerfully against the most efficient utilization of fish products in the public interest, and also against the increases of fish production which most governments in the region were seeking. Attention was drawn also to the changing pattern of fishing operations, the mechanization of which might be expected to lead to more concentration of landings at centres where marketing conditions were most favourable.

Government measures to improve fish marketing

A number of delegates described recent measures adopted to improve fish marketing in their respective countries. In India, provision had been made in the Second Five Year Plan to intensify efforts to improve fish marketing on a nation-wide basis with full co-operation between central and state government authorities. The success of co-operative marketing arrangements in Bombay and Orissa was cited as an example of the importance of co-operative organization in reducing the number of middlemen. In this connection, the Agricultural and Warehousing Act, 1956, was mentioned as a measure providing for the desirable linking of marketing with credit.

In the Federation of Malaya, too, great importance was attached to co-operatives as a means of improving fish marketing organization for the mutual benefit of consumers and producers. Recent success on the northeast coast was described, in which connection mention was made of the usefulness of contracts with hospitals, other governmental institutions and estates. Facilities were being expanded and it was planned to extend the experience gained to other parts of Malaya. In Ceylon some difficulties had been experienced with the use of centralized co-operative marketing facilities, and these were ascribed primarily to lack of commercial and technical experience. In Korea current plans envisaged the modernization of some 200 wholesale markets and a start had been made with Pusan. Emphasis was placed on the provision of more extensive facilities for storage processing and transport, leading to more complete and profitable utilization of fish products.

Co-operative marketing arrangements were also strongly supported in Vietnam, where some success had been achieved during the past three years. Reference was made to the advantages of the type of scheme used in Hongkong for the collection and centralized sale of catches and the possibility thus afforded for disposal through various outlets by auction, negotiation, or contract. Co-operative credit for the relief of indebtedness to middlemen was also available.

The delegates of Australia and the United States referred to various alternative fish marketing systems, and agreed that in this region, in many cases, the initiative would have to come

from governments, and the use of co-operative methods would appear very appropriate. The delegate of the United States also recommended the use of pilot scale demonstration projects as a very practical approach to these problems.

Future FAO Activities in the field of fish marketing

The Conference was informed of past and present activities in the field of fish marketing. These comprised case studies on the functions of middlemen and on the role of co-operatives, the regular publication of information on technological aspects of fish marketing through the medium of the FAO *World Fisheries Abstracts*, the organization of particular projects for the improvement of marketing and processing in certain individual countries, and the conduct of two regional training centres, one of fish marketing, Hongkong, 1954, and one on fishery co-operatives, Australia, 1957–8. In this last connection, a report on fish marketing conditions in the region had already been published, and a further report on fishermen's co-operatives in the region would shortly be available.

The Conference considered that there was an outstanding need for a more extensive exchange of experience in this field and for more widespread professional and technical training. Some special aspects were mentioned, for example, the development of standard fish marketing units for urban areas, and the improvement of fish marketing intelligence for the benefit of smaller centres remote from central marketing facilities.

Accordingly, the Conference concluded that FAO should continue to study fish marketing and fishery co-operatives and, in particular, should endeavour to arrange regional technical meetings and regional training centres in this field, and advise on the organization of pilot-scale demonstration projects.

Technical Assistance

Expert Services

Dr. Shao Wen Ling (China) is expected to return to Headquaters on or about 7 January 1959 on completion of his long term assignment to Colombo, Ceylon as a T.A. Fishery Officer. He will remain in Rome for approximately 20 days to complete his Report. After his stay in Rome, he will proceed directly to the United Stated of America, where he will take up a secondment assignment to the Fish and Wildlife Service of the U.S.A. Department of the Interior for a period of about 3 months.

Dr. Klaus E.W. Tiews (Germany) returned to Headquarters early in December 1958 on completion of his Intermediate Term assignment to Manila, Philippines, as TA Fishery Officer. He stayed in Rome about two weeks to complete his final report, and then returned to Germany.

Gerald B. Talbot, Chief of Middle Atlantic Fishery Investigations at the Fishery Research Laboratory, Beaufort, Nort Carolina, returned to Rome early in August 1958 from a mission to Pakistan of on behalf the food and Agriculture Organization, (FAO), Rome, Italy.

Mr. Talbot went to Pakistan to advise the Government on fishery research activities, particularly leading to the management of the great *Hilsa* fishery.

Hilsa, which is very similar to the Nort American shad, is one of the most

important commercial fish in the West and East Pakistan fisheries. The *Hilsa* represents about 30% of the fish landed in Pakistan. More than a million fishermen are engaged in the *Hilsa* fishery of the Ganges Delta system and catch about 500,000,000 lb. of *Hilsa* per year. The great problem is the fluctuation in catches, and there is urgent need for biological research to determine the stocks and devise methods for management of them.

Mr. Talbot has advised the Government of Pakistan on what should be done and how it should be organized and carried out.

Mr. R. Ruppin (Israel) arrived at FAO Headquaters in Rome on 25 September 1958 after completing a six-month assignment as FAO/ETAP Fisheries Training Center Specialist in India.

The terms of reference of his assignment were: "To advise the Government and give instuction on practical fishing courses at the already established training centres, and to organize and hold new training centres as would be needed by the Government."

Mr. Carl G. Bjuke (Sr.) arrived at Headquarters on 25 November 1958 to take up a short-term appointment (one month) to review the design of a number of fishing ports made by the FAO junior Fish Harbour Engineer, and to assist in finalizing the report to be sent by FAO to the Government of India. This is a continuation of other short-term assignment previously carried out in September-December 1955 and October 1956 to April 1957.

On completion of his 3-year assignment in India as FAO/TA Fish Harbour Engineer, **Mr. C. Ragnar Bjuke (Jr.)** arrived in Rome on 26 November 1958 to complete his final report (with the assistance of his father) on the work carried out during his assignment.

Dr. Francesco Baschieri Salvadori (Italy) arrived in India in mid November 1958 to assume his duties as Marine Fisheries Biologist under the Expanded Technical Assistance Programme, his duties in India will be:

> "To carry out under water exploration of pearls and chank beds in the Gulf of Mannar, to assess accurately the conditions and population of the sea shell fisheries and to advise on the methods of exploitation to the maximum without causing any depletion; to train the departmental staff as well as the local drivers"....

Dr. Baschieri graduated from Rome University in Natural Sciences Hydrobiology in 1950. In 1951 Dr. Baschieri became a Lecturer in the Institute of Zoology at the University of Rome, and in 1955 took up his post as Zoologist in the Zoological Cardons of Rome, acting as curator of fishes and studying the acclimatication of animals in captivity. He was also Scientific Director to the Italian Underwater Expedition in the Red Sea during 1953, and was also attached to the Italian Mission to the Oceanographic and Geo-Prehistoric cruise in the Eastern Mediterranean, on the schooner "Vema" as underwater biologist in 1956.

Fellowship

Mr. Abdel Khalek El-Sayed Imam, Superintendent of Serow Fish Farm, Egypt, visited India, Pakistan, Thailand and Indonesia, between September-December 1958 studying fish culture. Before coming to the Region Mr. Imam

spent six months in West Germany on the first leg of his visits.

Mr. Imam travelled on a fellowship granted by the Food and Agriculture of the United Nations for this study in order to gain practical training and experience in fundamentals of scientific fish culture, particularly carp breeding, and to study tropical methods and to participate in practical fish culture work in Far East Countries. During his visit to the countries in the Region, Mr. Imam spent time at important laboratories undertaking fish culture research. He also had discussions with fisheries administrators and research workers outside the field of fish culture.

Mr. Imam studied Chemistry, Botany and Zoology at the University of Cairo during 1945–1950 and obtained a B.Sc. Degree. During 1952–1954, Mr. Imam studied Oceanography at the Alexandria University and obtained a Diploma of Higher Study in Oceanography. During 1951–1953 he was Scientific Assistant, Scientific Institute, Alexandria, working as Hydrographer and also undertaking fisheries work. From 1954 to date Mr. Imam is Superintendent of Serow Fish Farm, engaged in rearing and biometric work, general work and fisheries research concerning Lake Menzalah.

On return home Mr. Imam will apply the knowledge gained during his fellowship for improving fish culture research and industry in Egypt.

Mr. D.A.S. Gnanadoss, Assistant Director of Fisheries (Craft and Tackles), Madras, India, was granted an FAO Fellowship for 9 months to undertake a combined theoretical and practical training in wooden boat building comprising :

a) Designs (draughtsmanship and calculations),
b) Boatyard practice,
c) Boatyard management,
d) Marine engineering.

Mr. Gnanadoss commenced his training in August 1958. His schedule provides for 5 months in the United Kingdom and 4 months in Italy.

Mr. Gnanadoss graduated in 1944 in Zoology and Chemistry from the American College, Madurai. In 1945 he recieved training at the All India Fisheries Training Centre, Madras, in the general principles of fisheries, navigation, oceanography, inland pisciculture and fisheries technology. In 1952 he was trained on board the Japanse Trawler *Taiyo Maru No. 17* on the techniques of fishing with modern gear. In July 1957 he attended the Goverment Training Centre, in small fishing-boat designing, construction and motorisation.

During 1956 - 1957 Mr. Gnanadoss was Inspector of Fisheries in Madras concerned with popularisation of Mechanised fishing boats. During March-June 1957 he was Assistant Director of Fisheries, Vellore, concerned with the implementation of Government Fisheries, Development Schemes, Since 1957 todate he is Assistant Director of Fisheries, (Craft and Tackle), Madras, concerned with construction of fishing boat and their mechanization. Mr. Gnanadoss had worked as counterpart assistant to Mr. K.K. Rasmussen, FAO/ETAP Naval Architect during the expert's assignment in India.

Mr. Kunio Yonezawa was appointed

to a fellowship under FAO's Technical Assistantce Programme for 1958. The award was made specific purpose of training Mr. Yonezawa in the Conservation of Salmon and Inland Fish. Mr. Yonezawa received this training from 2 June to 7 December 1957 in the U.S.A. and Canada.

IPFC AFFAIRS

Staff Movements:

Dr. M.R. Khan, Fishery Officer, FAO regional Office for Asia and the Far East, Bangkok and Technical Secretary, IPFC, leaves Bangkok on 15 February 1959 on transfer to take up his position as Fishery Technologist at FAO Headquarters in Rome. Dr. Khan, in his new assignment will be chiefly concerned with the publication of *FAO World Fishery Abstracts.*

Dr. Khan will be replaced by Dr. G.N. Subba Rao, who has during the past few years, been at the FAO Headquarters in Rome, mainly concerned with publication of the *FAO World Fishery Abstracts.* Dr. Subba Rao is due to arrive in Bangkok by the middle of March, 1959.

Eight Session of the Council

The 8th Session of the Indo-Pacific Fisheries Council was held in Colombo, Ceylon from 6-22 December 1959. Twelve of the 17 member countries were represented, the absentees being Burma, Cambodia, Indonesia, Pakistan and the Philippines.

The Session was officially opened by the Honorable Minister of Industries and Fisheries, Ceylon, Mr. P.H. William be Silva. Messages of greetings were received from Honorable the Prime Minister of Ceylon, Mr. S.W.R.D. Bandaranaike; the Director-General of FAO, Dr. B.R. Sen; and the Director of Fisheries Division, FAO, Dr. D.B. Finn.

Dr. Sen, in his Message, said ".....at the recently conducted Tokyo meeting (FAO Regional Conference for Asia and the Far East, Tokyo 10-16 October 1958), considerable attention was paid to the fisheries problems of the region, and I know that a great deal of work was passed on for your attention.

A particular point was made of the necessity of planning fisheries expansion in careful relation to expansion in other sectors of the economy, and I know that you are charged with advising your governments on how this should be done. The Conference resolved that a primary objective was the speedy increase of fish supplies for domestic markets, and set out three main lines along which it believed this could be done. You are here today to decide just how to implement this decision. Finally, the Conference pointed out the desirability of joint examination of problems in order to give guidance to fisheries departments. You are taking part in just such a joint examination.

At the opening of last year's conference (IPFC 7th Session) in Bandung, I was able to tell you of an increase in FAO's help in the provision of fisheries technicians in the region. I am delighted to be able to tell you that this help has been still further increased, and if plans for next year are carried out, will be increased even more."

In his presidential address, Dr. K. Kuronuma, Chief, Freshwater Fisheries Research Laboratory, Hinomachi, Minamitama-gun, Tokyo, and Chairman of the Council for the last inter-session period remarked that "..... I want to emphasize that research should be able to produce results that will be usable by the industries or by the administration.

It is very important to ensure that the research subjects are clearly identified and the problems evaluated in relation to the industries before the research programme is implemented.

I do not hesitate to stress that the discussion of technical matters should be undertaken, always keeping in mind how these matters could be finally put into practice."

Dr. Finn, in his message of greetings expressed hopes that the discussions at the Session would result in important information as well as decisions on resource appraisals, gear and production problems and fish marketing.

Membership

The Federation of Malaya having accepted the Agreement which created the Indo-Pacific Fisheries Council 10 years ago, became the 17th member of the Council.

Statements

The followings are some of the points arising out of statements tabled by the various delegates:

Ceylon: To achieve self-sufficiency in 10 years would require a five-fold increase in local fish production. Development of off-shore and deep sea fisheries is being encouraged. Considerable progress has been made in developing the inland fisheries by the introduction of suitable fish species and plans are being implemented to develop brackish-water fish production. The ancient pearl fisheries have been revived after a lapse of 30 years and considerable emphasis is placed on research into the problems of the industry.

France: The importance of the standardization of research methods was emphasized as an essential condition for the reliable comparison of results obtained in the various countries.

India: Fisheries survey programmes have been expanded and the Central Board of Fisheries, under the chairmanship of the Union Minister of Food and Agriculture had been set up to co-ordinate and integrate programmes of fisheries development and research. A special Expert Committee on Fishery Education was conduction an examination of the training requirements and a high level of co-operation was being maintained by the Union and State Governments, as well as the United Nations aid giving Agencies.

Japan: The fishery industry of Japan was confronted by many problems, and may workers were engaged in research and survey studies to seek solutions to these problems. The Japanese Government was providing training facilities in the field of fisheries for students from many countries in the region and was firmly determined to develop and expand these facilities and to co-operate to the best of her ability with other countries to ensure healthy progress of the fishery industry of the region.

Korea: The fishery industry was on the road to recovery through the utilisation of modern fishing equipment. Many problems, however, still remain to be solved.

Malaya: Measures for the development of fisheries included mechanisation of fishing craft, use of synthetic fibres for net making and provision of loans to the industry through co-operative organizations.

Measures were also being taken to develop inland fisheries by stocking natural waters and through fish culture. Malaya was contributing to the cost of the Fish Culture Research Institute in Malacca.

Netherlands: The programme of work undertaken though the Fisheries Extension Services in Netherlands New Guinea included advice and assistance in connection with group fishing practice, operation, maintenance and repair of mechanised fishing boats, dissemination of information on improved methods of operating of existing fishing gear and introduction of new techniques and material. Fresh-water fisheries was being actively developed by introducing non-indigenous species.

Thailand: Steps were being taken in the development of fish culture and the management of inland fishery resources. Sea fishery was being developed through mechanisation of fishing craft and improvement of gear. Marketing facilities were being improved but there still remain wide scope for further exploitation of the marine resources on a rational basis.

United Kingdom: Fisheries developments in Hong Kong were largely in the direction of exploration and exploitation of off-shore trawling grounds and institution of training programmes to quality fishermen as skippers, coxswains and engineers. Mechanisation of the fishing fleet was making rapid strides and the pond culture of fish was a flourishing industry. There was an expanding demand for cultivated oysters and a comparatively new expert trade in prawns was increasing. In addition to exploratory fishing, regional hydrology and plankton surveys were being undertaken by the Fisheries Research Unit and studies on the biology of prawns and the effects of industrial pollution on in-shore waters were progressing.

Development plans for the marine and freshwater fisheries in Sarawak and North Borneo were being implemented. Forther Borneo is perhaps unique in that it produces an exportable surplus of marine products.

In Singapore trawling was developing and the mechanization of fishing boats increasing. A mobile fisheries unit providing instructions in the maintenance and repair of fishing boats was active and a storm-warning service through local radio broadcasts had been set up. The training of school boys in the fishing villages was being tested through a pilot scheme in order to select apt pupils for further training in advanced fishing techniques.

U.S.A: American exploratory research in the Central Pacific Ocean was drawing to a close. The final exploratory project was the oceanographic, biologic, and tuna survey of the general vicinity of the Marquesas Islands of which also the field work was completed and the final reports are now being pre-

pared. The research programme is shifting to give greater attention to the prediction of variations in the tuna resources, the reduction of scouting time and the increasing of fishing efficiency on a basis of tuna behavious studies and related studies on baits.

Vietnam: Development plans laid special emphasis on modernization of fishing techniques and mechanisation of fishing craft, provision of fish harbours and financial assistance to fishermen. Training of fishermen was receiving considerable attention and a large fund was reserved for the use of fisherman's Co-operatives.

Progress and Recommendations Planning Developments

The Council expressed the opinion that there was considerable imbalancc in the development of the various phases and aspects of the fisheries industry in this region and that plans for the development of fisheries were not always co-ordinated with similar plans for development in other sectors of the national economy. The Council stressed the need for such co-ordination as well as for co-ordinated development of the various aspects of the fisheries industry.

Age Determination of Fish

Research workers were urged to take advantage of check marks in hard parts of fish resulting from annual or semi-annual changes in the environment of sufficient magnitude. The possibility of determining the age of fish on the basis of changes in body proportion with age was noted. Studies on population dynamics were also possible without determining the age of the fishes.

Population in dynamics

The importance of the methods of assessing the relations between fish stocks, the yields obtained from them and the methods and intensity of fishing and the role of these methods in providing a focal point for biological and technological studies of fishing industries was reaffirmed.

Fish Culture in General

Rigid control of the introduction of non-indigenous species was considered necessary. However, adequate research should precede action in this matter.

Fish Culture in Rice Fields

Methods of fish culture in the rice fields should be based on the interaction of rice and fish, that is, the influence of rice on the growth of fish, the influence of fish on rice yield and the effect of insecticides on fish. Organizations dealing with rice cultivation and fish culture chould co-operate on national and international levels.

River Basin Development

Surveys should be carried out on notice being given of impending constuction of dams, and the sites should be cleared before water is allowed to accumulate, in order to facilitate exploitation of the reservoir. After the completion of the project, biological surveys should be continued. The results of such surveys should provide the basis of action by the Government Agency concerned, designed to protect existing fisheries or develop new ones.

Rastrelliger

The report on the IPFC/FAO Training Center on the Methodology and Techniques of Research on Mackerel

(*Rastrelliger*) conducted in Bangkok in November-December 1958 was approved. Member Governments and the FAO, where concerned, were requested to take appropriate measures for the implementation of the recommendations contained in this report.

Improvement of Craft

The improvement in the design of fishing craft mostly concerned adaptation of the indigenous craft of mechanisation. Considerable progress was reported from various countries.

Member Governments were requested to ascertain whether their requirements were for surf-riding-beach-landing craft or simple beach-landing mechanised craft.

Mechanisation of fishing craft was making rapid progress in most of the member countries.

Improvement of Gear

Synthetic fibre was progressively gaining popularity. Import regulations in some instances did not permit adequte quantities to be made available.

Training of Fishermen

Several Member Governments had well organised training programmes for fishermen. Those in India, operated with the assistance of FAO, had proved extremely successful.

Cured Fish

Improvement of quality for cured fish in the Indo-Pacific region must recognise consumer preference, for varying degress of putrefaction, and/or fermentation. It was emphasized, however, that the products should be free from factors physiologically harmful to human beings.

Research in the cured fish industry should be planned to define the defects in the industry and to evolve measured for their elimination; should be promptly applied.

Artificial drying of fish where necessary, should be done with equipment of very simple design and requiring small capital outlay. The drying techniques should be modified to result in a slight degree of putrefaction in the product in order to meet consumer demand.

Fish Flour for Human Consumption

The fish flour did not appear to have significant possibilities in the region at present. Consumer preference and resistance to new products as well as economic considerations might make it desirable to process surplus fish where available, into form which are already accepted by the consumer.

Canning

The inherent difficulties were in the procurement and operation of canning machinery in this region and in obtaining continued supplies of tin plate and in the marketing of canned fish products. The organization of the industry should be promoted in partnership with established concerns of countries where the canning of fish is well developed.

Boiled Fish

Boiled fish, a commercial product in Thailand, Malaya and Vietnam represents a very simple and practical means for preserving fish for 2-5 days. In order to encourage Member Gevernments to develop this product in their countries where it does not exist the Council,

decided to produce a comprehensive report on the product with the co-operation of FAO.

Training Centre in Fish processing

FAO was requested to organise a training centre (Seminar) on Fish Curing in Humid Tropics with special Reference to the Indo-Pacific region. This training centre should primarily aim at defining as precisely as possible, the defects in the fish curing industry and in suggesting suitable remedial measures.

Statistics

The Concil suggested that in view of the limitations of technically trained personnel, of equipment and of funds available, Member Governments might consider the desirability of centralised collection of fisheries statistics. It was however specifically stressed that such centralised statistical organizations should have on thier staff, officers specially trained in the collection of fisheries statistics and that such officers should be made available for collection of statistics in fisheries in preference to those in other fields.

Fish Marketing

In veiw of the inability of the Fishermen Co-operative Societies in certain member countries to undertake fish marketing entirely on their own, some degree of government participation in fish marketing is necessary at the present stage. Such participation should however be in the form of assistance and guidance to organizations sponsored by Governments but enjoying a satisfactory degree of autonomy and should provide for where the circumstances permit, the eventual operation of such organizations on a co-operative basis.

Quality grading and control, particularly for the export trade, should be promoted where possible. The imposition of such control should, however, be preceded by adequate measures for publicity and education and should provide necessary inspection and analytical services.

FAO was requested to organise a short Training Centre in which experienced fishery officials directly connected with fish maketing in the member countries would participate. The Centre would primarily aim at defining the defects in the fish marketing system, and at formulating measures for the removal of such defects.

Socio-Economics

There was little spontaneous growth of Fishermen's Co-operative Societies and the impetus for the organization of such societies has come chiefly from the governments.

There was an urgent need for intensification of extension work in the member countries for an expeditious development of these societies. Governments assisting these societies should exercise a mininum of control on them. The societies should undertake marketing of the produce of their members and where this was not possible, the governments might consider the promotion of autonomous bodies as a temporary measure to undertake these activities with a new primary to training the societies to take over in due course.

Office Bearers

The following Office Bearers were elected for the next Inter-Session period and the 9th Session :

Chairman of the Council	–	Monsieur Tran Van Tri, Vietnam.
Vice-Chairman of the Council	–	Mr. D.T.E.A. de Fonseka, Ceylon.
Chairman of Technical Committee I	–	Mr. Soong Min Kong, Malaya.
Chairman of Technical Committee II	–	Mr. L. Tisseverasinghe, Ceylon.

9th Session

The Council adopted the recommendation that the 9th Session should be held during the last quarter of 1960. The place for the Session could not be decided upon as no invitation from Member Governments for holding the 9th Session was received.

Rastrelliger Training Centre

The IPFC/FAO International Training Centre on Methodology and Techniques of Research on Mackerel (*Rastrelliger*) held in Bangkok, Thailand, from 20 October to 28 November 1958, was attended by participants from Ceylon, India, Indonesia, Korea, Malaya, Philippines, and Thailand. The staff of the Centre was

Director:	Mr. Boon Indrambarya Director-General, Department of Fisheries, Government of Thailand.
Associate Director:	Mr. S.J. Holt Chief, Research Program Section, Biology Branch, Fisheries Division, FAO, Rome.
Lecturers:	Mr. J.A. Gulland Senior Scientific Officer, Fisheries Laboratory, Lowestoft, Suffolk, England.
	Dr. K.F.W. Tiews Institute of Coastal and Inland Fisheries, Federated Research Board of Fisheries, Hamburg, Germany.

The Centre was held in the Biology Department, Chulalongkorn University, Bangkok, and field visits were made to fishing centres and also to the Central Bangkok Fish Market.

The Report of the Centre was prepared and submitted at the 8th Session of the Indo-Pacific Fisheries Council, Colombo, Ceylon, 6–22 December 1958 as document IPFC/C58/WP 28. The main report consists of 61 pages, with 23 appendices relating to specific aspects of the Centre.

The recommendations and conclusions derived from the Training Centre are incorporated in the main Report, prepared in narrative form, but these recommendations are analysed in brief in Appendix 22 with back references to the particular sections of the report which outlines them in detail.

The final printed report of the Training Centre will not be available for some time but readers who wish to obtain copy of the mimeographed document may address their request to the Secretary, Indo-Pacific Fisheries Council,

FAO Regional Office, Bangkok. Only a limited number of the mimeographed reports are available.

Statistics Training Centre

The FAO Indo-Pacific Training Centre in Fishery Statistics is being held in Bombay, India between 13 February–30 April 1959. Dr. Randhawa, Vice President of Indian Council of Agricultural Research (ICAR) is Director of the Centre. Dr. V.G. Panse of the ICAR is Deputy Director. Dr. N.K. Panikkar, Fisheries Development Adviser, Ministry of Food and Agriculture, India and Dr. C.V. Kulkarni, Director of Fisheries, Bombay are associate Directors. Mr. K.A. Bennet, Deputy Regional Representative of the Director-General of FAO for Asia and the Far East (Western Zone is FAO's Associate Director).

Instructors

The Government of India is providing the following lecturers:

Dr. V.G. Panse, Dr. Pannikar, Dr. C.V. Kulkarni, the Agricultural Marketing Adviser to the Government of India, the Economic and Statistical Adviser to the Government of India, Dr. G.R. Seth, Mr. Darogasing and Mr. Banerjee.

FAO is providing the following lecturers:

Dr. D.B. Finn, Director, Fisheries Division, FAO, Rome

Dr. F.E. Popper, Economic Branch, Fisheries Division, FAO, Rome

Mr. S.J. Holt, Biology Branch, Fisheries Division, FAO, Rome

Prof. G.M. Gerhardsen,

Dr. P.V. Sukhatme

Dr. K.V.R. Sastry

Mr. T. Yamamoto, Statistics and Research Division, Ministry of Agriculture and Fishery, Tokyo, Japan.

PERSONALIA

Mr. E.R.A. de Zylva, Deputy Director of Fisheries, Ceylon, retired from service from October 1958. Mr. de Zylva was appointed Assistant Director of Fisheries on 15 May 1945. He acted as Director on three occasions from April 1946 to February 1947, November 1949 to September 1954 and February to April 1958. He was Deputy Director from October 1954. Me. de Zylva took an active part in the development of Fisheries and of the Fisheries Department and his untiring efforts in such spheres as mechanization of fishing craft and the culture of fresh water fish is widely known and appreciated.

Mr. de Zylva has been actively associated with the IPFC. He represented his country at the 6th Session of the Council. He has also served several terms as his country's nominee on Technical Committee II.

Mr. L.F. Tisseverasinghe, Assistant Director, was appointed Deputy Director of Fisheries (effective early

December 1958). This post became vacant on the retirement of Mr. E.R.A. de Zylva.

Mr. Tissevarasinghe has been actively associated with the IPFC. He represented his country at the 7th Session of the Council. He was Rapporteur for Technical Committee II during 1957-1958 and is Chairman of the same Committee for 1959-60.

Mr. K.N. Das was appointed Deputy Director of Fisheries (Extension), Ministry of Food and Agriculture, Government of India. He will be responsible for organizing and implementing fisheries extension programmes on an all-India basis. Prior to his present assignment, Mr. Das was Fisheries Extension Officer, Ministry of Food and Agriculture, India, with Headquarters at Calcutta.

Mr. M.P. Devasundaram was appointed Deputy Director (Fish Marketing). He will be responsible for surveying the present fish marketing conditions in India, organizing the marketing of fish and fish production on modern lines and implementing pilot fish marketing projects. Prior to his present assignment, Mr. Devasundaram was Fisheries Extensoin Officer stationed at the Central Marine Fisheries Research Station, Mandapam.

Mr. R. Venkaraman was appointed Assistant Director (Processing) in the Ministry of Food and Agriculture, Government of India. He will work as counterpart assistant to the FAO/ETAP Fish Processing Expert to be assigned to India. The services of the experts have been sought for organizing the Processing Section of the Central Fisheries Technological Research Station at Cochin. Mr. Venkataraman will also undertake research in the processing techniques for fish. Prior to his present assignment, Mr. Venkataraman was Superintendent, Fisheries Technological Station, Tuticorin. Mr. Venkataraman received training in fish processing and technology at the School of Fisheries, University of Washington, Seattle, U.S.A. He also toured extensively in U.S.A., U.K. and Canada visiting important fishing centres and research Station, Aberdeen, Mr. Venkataraman worked with Dr. J.M. Shewan for about 8 months during 1947-1948.

Mr. R. Roy Choudhuri was appointed Assistant Director (Naval Architecture, Ministry of Food and Agriculture, India. Prior to his present appointment, he was Draughtsman at the Hooghly Docking & Engineering Co., Ltd., Calcutta. Mr. Choudhuri received this training at various ship-yards in Calcutta and Vishakhapatnam as well as at the Indian Naval Dockyards in Bombay.

REGIONAL MEETING OF SPECIALISTS IN MARINE SCIENCES

A Regional Meeting of Specialists in Marine Sciences was held in Saigon during 14–17 January 1959. Specialists from the following countries attended the meeting: Republic of China, Indonesia, Japan, Republic of Korea, Malaya, Philippines, Singapore, Thailand, and Republic of Vietnam, together with Unesco consultants and observers from FAO, Pacific Science Association and

different scientific institutions. Cambodia and Hong Kong had also been invited to the meeting but there were no participants from these countries.

The meeting was called by the Unesco Science Co-operation Office for Southeast Asia and its purpose was to discuss current problems of marine research in Southeast Asia, and especially the possibility of undertaking long-term regional research projects and training programmes with the assistance of Unesco.

Report outlining the activities in marine sciences in the various countries were presented and discussed.

Dr. K. Wyrtki of the CSIRO, Marine Laboratory, Cronulla, Australia, read his report on physical oceanography in the Central Indo-Pacific region (SEASCO/MS/Saigon/1). He stressed the lack of observation material. The monsoon circulation in these waters is the basic problem from the view point of physical oceanography. He gave an outline of his proposal to study the monsoon circulation in the Java and China Seas to obtain information about the structure and composition of the water masses, the water exchange, the productivity and, perhaps, the plankton distribution. This could be combined into a general plan for the region with the Japanese proposal presented by Dr. Uda (Unesco/NS/Ocean/72).

The plans of the Scripps Institution for an oceanographic expedition into the South China Sea and the Gulf of Thailand would from a valuable complement to the above plans.

Mons. R. Serene, Technical Expert, Oceanographic Institute, Nhatrang read a report on marine biology in the Central Indo-Pacific region (SEASCO/MS/Saigon/4). Important needs are studies of the species and their distribution.

Dr. Anton Fr. Bruu, Lecturer in Oceanology, University of Copenhagen, Denmark, presented a report on a Survey of the Status of Biology of the Asian-Australian Seas (SEASCO/MS/Saigon/8), and gave an outline of the general problems of the region.

Mr. J.A. Tubb of FAO Regional Office in Bangkok and Secretary of the Indo-Pacific Fisheries Council (IPFC) gave an account of the activities of the Council, especially the *Rastrelliger* training centre in Bangkok last October-November and the Unesco-IPFC plankton-net project. The meeting asked Unesco and IPFC to study the possibility of a further extension of this project so as to make a greater number of nets available.

Plans for Regional Projects

The meeting endorsed the general outline of a programme involving extensive systematic biological and physical oceanographic investigations on a large scale in collaboration with research institutions of the countries of the region. The programme is estimated to cost a total of $1,927,500 spread over 1961–1965. It was suggested that the scientific programme should be discussed in detail at the first meeting of the Planning and Directing Committee proposed to be set up under the project.

The meeting discussed in detail the UNESCO marine science training

course to be held in Nhatrang in 1959 for about 20 participants, and hope was expressed that universities of the region would take advantage of this course and complete their curricula.

Mr. J.L. Faughn of Scripps Institution of Oceanography, La Folda, California, gave information about the research project planned during the next two years by the Scripps institution of Oceanography in California. A research vessel of 327 tons will be placed at the disposal of the Institution by the Vanderbilt Foundation to work in the South China Sea and the Gulf of Thailand.

A biological reference collection was considered to be desirable at all major marine research institutes of the region. Therefore, it was recommended that a taxonomic expert should be appointed as soon as possible and for a longer period. He should visit the institutes of the region and work together with the local scientists on these reference collections.

A special recommendation was approved asking Unesco to request the countries of the region to give their co-operation in respect of the drift bottle launching project of the Nhatrang Institute.

FORTHCOMING CONFERENCES, MEETINGS AND TRAINING CENTRES

Date	*Subject of Conference*	*Convening Body and / or Organizers*	*Location*
		1959	
January			
14 - 18	UNESCO-Regional Marine Science Experts Meeting	Secretary, International Advisory Committee on Marine Sciences, UNESCO	Saigon
19 - 24	EPA Seminar on the improvement of retail marketing of fresh and frozen fish		Neuweid Germany
21 - 28	Indian Science Congress - 46th Congress	General Secretary, Indian Science Congress Association, 1 Park Street, Calcutta - 16, India	New Delhi
April	* FAO 2nd World Fishing	Mr. J.O. Traung	Rome
5 - 10	Boat Congress	Secretary, Fisheries Division, FAO, Rome	
14 - 16	CIBA Foundation - 5th Colloquium on Ageing: The Life Span of Animals	Dr. H.N.H. Genese Deputy Director The CIBA Foundation 41 Portland Place London, W. 1	London
29 - 2 - 3 weeks	4th South Pacific Conference	South Pacific Commission Post Box 9 Noumea, New Caledonia	Malaguna, (Rabaul) Papua and New Guinea
May Undet.	The Baltic and International Maritime conference - General Meeting	—	London
*12 - 21	Technical Meeting of Fishery Co-operatives	Mr. F.E. Popper Fisheries Division FAO, Rome.	Naples
May ?	European Inland Fisheries Advisory Commission	Fisheries Division FAO, Rome.	Ireland ?
May 19 - 22	ECE Working Party on Transport of Perishable Foodstuffs	Secretary, Economic Commission for Europe	Geneva
June	International Congress	-	Wiesbaden,

* Indicates Meeting to which IPFC has been officially invited.

Date	*Subject of Conference*	*Convening Body and / or Organizers*	*Location*
15 - 20	on Combustion Engines (CINAC) - 5th Congress		Germany
22 - 26	International Whaling Commission - 11th Meeting	Secretary International Whaling Commission, c/o Fisheries Department, Ministry of Agriculture, Fisheries and Food, 3 Whitehall Place, London, S.W. 1.	London
Undet.	Carribean Seminar on Fisheries - 3rd Seminar	Executive Secretary, Gulf and Caribbean Fisheries Institute, Marine Laboratory, University of Miami, Coral Gables - 34, Florida, U.S.A.	San Maarten, Antillas, Holandesas
August 19 - 26	International Institute of Refrigeration - 10th International Congress	Secretary International Institute of Refrigeration 177 Boulevard Malesherbex Paris 17e	Copenhagen
20 - 8 Sept.	14th International Limnological Congress	Dr. T.T. Macan General Secretary and Treasurer, International Association of Limnology, c/o Freshwater Biological Association, Ferry House, Ambleside, Westmorland, England	Vienna
30 - 12 Sept.	International Oceanographic Congress	American Association for the Advancement of Science in co-operation with UNESCO, the Special Committee on Oceanographic Research of ICSU, and FAO Dr. Mary Sears Chairman, Committee on Arrangements, Woods Hole Oceanographic Institute Woods Hole, Mass., U.S.A.	New York
September 14 - 21	FAO World Scientific Meeting on the Biology of Sardines and Related Species	Mr. H. Rosa, Jr. Fisheries Division FAO, Rome	Rome

Date	*Subject of Conference*	*Convening Body and / or Organizers*	*Location*
2nd half	ECAFE - Working party on Small-scale Industries and Handicraft Marketing- Canning and Bottling of Fruits and Food- in Co-operation with FAO	Executive Secretary, Economic Commission for Asia and the Far East, Sala Santitham, Rajdamnern Avenue Bangkok, Thailand	Undet.
20 - 30	Expert Meeting on Fishery Statistics in the North Atlantic Area	Fisheries Division, FAO, Rome	Edinburgh
28 Sept. - 2 Oct.	ECE - Working Party on Standardization of Perishable Foodstuffs - 10th Session	Executive Secretary, Economic Commission for Europe, Palais des Nations, Geneva	Geneva
October	CCTA - Symposium on Biology and Maritime Fisheries of the East African Coast	Executive Secretary, Commission for Technical Co-operation in Africa, South of the Sahara	Cape Town
	CCTA - Symposium on Sea Fisheries on the West Coast of the Indian Ocean	,,	Cape Towu
	CCTA - Meeting of Specialists on Hydrology	,,	Ghana

FAO TRAINING CENTRES

1959

13 Feb. - 30 April	FAO Indo-Pacific Training Centre in Statistics	Mr. F.E. Popper Fisheries Division FAO, Rome	Bombay
17 Aug. - 19 Sept.	International Training Centre on Fishery Statistics for the Mediterranean African, and the Near East Region	,,	Denmark
Nov. - Dec.	International Training Centre on Fishery Surveys	Dr. G.L. Kesteven Fisheries Division FAO, Rome	Tanga

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